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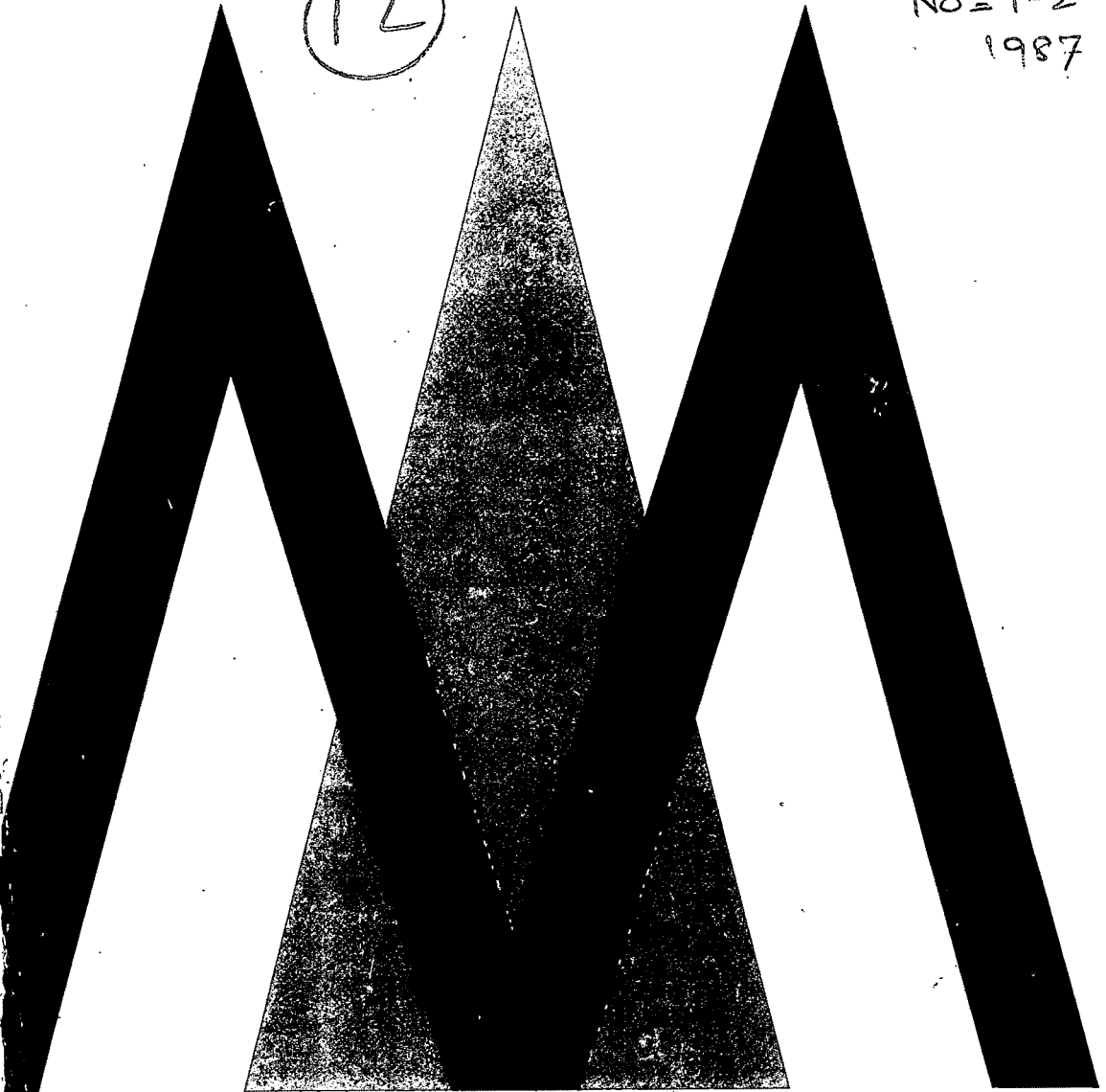
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The *Journal* publishes only original, empirical research as articles or research notes. Manuscripts are considered with the understanding that their contents have not been published and are not under consideration elsewhere. In its articles, the *Journal* seeks to publish reports of research that develops, tests, or advances management theory and practice. All types of empirical methods—quantitative, qualitative, or combinations—are acceptable. The *Journal* does not publish purely conceptual or review articles; these are published in the *Academy of Management Review*. Atheoretical exploratory or survey research, methodological studies, replications or extensions of past research, and commentaries with new empirical content are also of interest for publication as research notes if they make an important contribution to knowledge relevant to management.

Articles and research notes should be written so they are understandable and interesting to all members of the Academy. The contributions of research in all specialized areas to general management theory and practice should be made evident. Specialized argot and jargon should be translated into terminology in general use within the fields of management.

Articles should also be written as concisely as possible without sacrificing meaningfulness or clarity of presentation. To save space, tables should be combined and data should be presented in the text wherever possible. Manuscripts submitted for publication as articles should not ordinarily exceed 30 double-spaced typewritten pages, including tables. Manuscripts submitted for publication as research notes should not exceed twelve double-spaced typewritten pages, including tables. Everything, including tables, in submitted manuscripts should be typed in double-spaced format on one side of the page. Manuscripts prepared on computers should be printed on letter-quality printers or, if other printers are used, in double-strike or enhanced print.

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Published by the Academy of Management four times a year in March, June, September, and December. Subscription rates for U.S., Mexico, and Canada: \$38 for one year, \$70 for two years, \$96 for three years. Rates for overseas: \$42 for one year, \$78 for two years, \$108 for three years. All payable in U.S. dollars.

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Typesetting by Repro Services, Inc., Decatur, Georgia; presswork, binding, and mailing by Darby Printing Company, Atlanta, Georgia.

Academy of Management Journal, Publication No. 900920.

Second class postage paid at Atlanta, GA, and additional mailing offices.

POSTMASTER—Send Form 3579 to *Academy of Management Journal*, P.O. Drawer KZ, Mississippi State University, Mississippi State, MS 29762.

ISSN, 0001-4273

FROM THE EDITOR

This is the last year of my editorship and a year of transition for the *Journal*. Rick Mowday has been named Associate Editor for this year and will assume the editorship next January. To ease the transition, he will begin receiving new submissions on July 15, 1987. New submissions before that date and all revisions of prior submissions should be submitted to me at New York University. Rick has been a great help to me and to authors as Consulting Editor. I'm very pleased that he will be the new editor because I know from working with him how capable, fair, discerning, and conscientious he is. The *Journal* will flourish under his editorship, I'm sure.

Many others have made outstanding contributions to the *Journal* over the past year. Manny London and Carl Zeithaml have also performed admirably as Consulting Editors, contributing many hours of careful, patient, expert reading and commentary. Although the Editorial Board had some turnover, most members are stalwarts who continue to contribute two or more careful and constructive reviews every month. Also, over 150 scholars, most of them listed in the December 1986 issue, served as ad hoc reviewers last year. In another feat of working against tight deadlines, Nancy Dodd compiled another detailed subject index for Volume 29. Finally, I had the help of a superb staff—Seph Weene, Steve Gomes, Denise Fredericks in Buffalo and Antoinette Amaranto in New York, plus a number of student assistants—to deal with manuscripts at every stage of the editorial process. I want to thank them personally and on behalf of all *AMJ* readers for the superb job they've done and for the cooperation and help I've received from all of them.

The status on December 31, 1986 of all manuscripts submitted since the start of my editorship follows:

	1984 ¹		1985		1986	
	N	%	N	%	N	%
Accepted	33	13.4	31	6.9	9	1.9
Under revision	19	7.7	40	8.9	66	13.8
Rejected	194	78.9	379	84.2	327	68.4
Under initial review					76	15.9
Total submitted	246		450		478	

Turnaround times from submission to first decision letter for manuscripts submitted in the last two years were:

	1985				1986			
	N	Median	Mean	s.d.	N	Median	Mean	s.d.
Rejected	343	55	54.5	33.3	323	49	48.7	26.8
Revisions	106	78	78.2	26.0	79	58	62.8	22.1
Overall	449	55	60.1	33.3	402	49	51.5	26.5

At this point sufficient submissions have accumulated to make a report of status by subfield meaningful. The table that follows reports the status on

¹ For period July 15–December 31, 1984.

December 31, 1986 of all manuscripts submitted during my editorship on which decisions had been made. It does not include manuscripts now out for initial review, but does include all for which at least one review process was completed. To save space, frequencies are reported only for submissions; interested readers can easily calculate them for other categories.

Subfield	Submitted		Rejected	Under Revision	Accepted
	N	%	%	%	%
Business Policy	158	14.4	76.6	17.1	6.3
Careers	12	1.1	83.3	8.3	8.3
Entrepreneurship	9	0.8	77.8	22.2	0.0
Health Care	4	0.4	100.0	0.0	0.0
Human Resources	128	11.7	80.5	10.9	8.6
International Management	32	2.9	81.3	15.6	3.1
Industrial Relations	15	1.4	86.7	6.7	6.7
Management Education	20	1.8	95.0	5.0	0.0
Methods	15	1.4	92.9	0.0	7.1
Management Info Systems	8	0.7	87.5	12.5	0.0
Organizational Behavior	415	37.8	84.6	8.4	7.0
Organizational Communications	20	1.8	85.0	15.0	0.0
Organizational Development	14	1.3	78.6	14.3	7.1
Organizational Theory	161	14.7	74.5	16.1	9.3
Production/Operations Mgmt	9	0.8	77.8	0.0	22.2
Public Sector	1	0.1	100.0	0.0	0.0
R&D/Technology/Innovation	4	0.4	75.0	0.0	25.0
Social Issues	19	1.7	94.7	5.3	0.0
Women in Management	25	2.3	92.0	8.0	0.0
Miscellaneous	29	2.7	89.7	10.3	0.0
Overall	1098	100.2	82.0	11.4	6.6

The only subfields for which percentages of submissions rejected, revised, or accepted differ substantially from those for all submissions are ones with relatively few submissions. A different decision for only one or two papers would change percentages substantially for these subfields. Readers should also be aware that assignment of papers to only one subfield often seems arbitrary; consequently I assign many to more than one subfield. We checked to see if counting papers in more than one subfield would yield percentages different from those reported, which were computed on the basis of the first subfield to which papers were assigned. For the four biggest subfields, percentages were similar with both systems of counting. But using one subfield does not do justice to the breadth of many submissions and thus tends to underrepresent total submissions in subfields.

The fact that more than 11 percent of submissions are out there being revised is a bit disheartening. I hope we can still bring many of these papers to a publishable stage soon. To that end, I ask all who have papers under revision and still plan to resubmit to get busy and get those revisions in. I will continue to receive revisions until December 31, 1987, but after that date they will have to be resubmitted to the new Editor and Editorial Board.

I've enjoyed the contacts I've had with so many of you.

January 12, 1987

J. M. B.

STRATEGY MAKING AND STRUCTURE: ANALYSIS AND IMPLICATIONS FOR PERFORMANCE

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This study suggests that organizational structures and strategy-making processes are highly interdependent and must be complementary in many ways to ensure good performance under challenging conditions. An empirical analysis of 97 small and medium-sized firms showed that structural formalization and integration were related to the levels of interaction and proactiveness among decision makers and to four aspects of rationality in decision making: analysis of decisions, planning, systematic scanning of environments, and explicitness of strategies. Centralization of authority was related to planning, risk taking, and consensus-building. Structural complexity had few associations with strategy making. Relationships between strategy making and structure were usually strongest among successful and innovative firms and seemed to contribute the most to performance in sizeable and innovative firms.

Although many investigators have studied the components of structure (Hall, 1977; Pugh, Hickson, Hinings, & Turner, 1968; Reimann, 1973) and the processes of strategy and decision making in complex organizations (Carter, 1971; Mintzberg, 1973a; Pettigrew, 1973; Quinn, 1980), they have made little attempt to relate the two. Yet there may well be intrinsic associations between strategy making and structure. The structure of an organization importantly influences the flow of information and the context and nature of human interactions. It channels collaboration, specifies modes of coordination, allocates power and responsibility, and prescribes levels of formality and complexity (Bower, 1970). How then could it fail to influence the making of strategy (Fredrickson, 1986; Hedberg, Nystrom, & Starbuck, 1976)? There is also likely to be a reverse causality: dimensions of decision making can motivate adoption of certain structural devices. Analysis of decisions and formal planning can, for example, induce structural sophistication by prompting recruitment of expert staff and specialists to carry out these activities, which would increase specialization and technocratization. In

This paper is dedicated to the memory of Joseph E. Levin (1948-1986). The author is indebted to the government of Quebec for FCAC Grant No. EQ1867, to the Social Sciences and Humanities Research Council of Canada for Grant No. 494-84-0012, to Jean-Marie Toulouse for help with the data gathering, and to several anonymous reviewers for their useful suggestions.

fact, structural and strategy-making sophistication represent complementary modes of adaptation that, kept properly aligned, will enhance performance. This will be particularly true when firms face especially complex and uncertain administrative tasks.

This study focused on formal structural and strategy-making processes. Structure is the enduring allocation of work roles and administrative mechanisms that allow organizations to conduct, coordinate, and control their work activities (Jackson & Morgan, 1982: 81). The strategic decision making process includes the activities—social as well as cognitive—that make up the deliberations, actions, and interactions of managers making strategic decisions. Such decisions may concern product-market strategies, major financial commitments, production policies, and upper-echelon staffing.

CHARACTERIZING STRUCTURE AND STRATEGY MAKING

A central problem in relating structure to strategy making is selection of variables. There has been much empirical research on structure. In his review of this literature, Champion (1975) catalogued individual variables according to their frequency of use in key journals and textbooks. His list includes specialization, formalization, size of administrative and staff components, centralization of authority, vertical span, and number of operating sites. Other studies have also suggested many of these dimensions (e.g., Child, 1972; Pugh et al., 1968; Pugh, Hickson, & Hinings, 1969; Reimann, 1973). Hage and Aiken (1970) and Khandwalla (1977) studied two additional aspects of formalization—extent of formal controls and proportion of professionals. Finally, Lawrence and Lorsch (1967), Galbraith (1973), and Mintzberg (1979) discussed structural integration, referring to liaison devices such as coordinative committees and task forces.

To be as comprehensive as possible, this study assessed structure along all of these dimensions, expecting to find composite *formalization*, *centralization*, and *complexity* factors similar to those that have emerged consistently in earlier studies (Frederickson, 1986; Hall, 1977; Van de Ven, 1976). Liaison devices were expected to compose a fourth factor, *integration*, because they seemed unrelated to the first three factors.

Hard as it is to do an adequate job of characterizing the structure of an organization, it is perhaps even more difficult to describe strategy making. Fortunately, the literature has begun to converge around three multifaceted dimensions of the strategic decision making process: *rationality*, *assertiveness*, and *interaction*.

Table 1 summarizes these three dimensions, presenting their sources in the literature and the organizational types that illustrate their polarities. The first dimension—*rationality*—is central to two schools of thought. Scholars have referred to the first as the synoptic (Frederickson, 1984; Lindblom, 1959), planning (Mintzberg, 1973a), or rational (Miller & Friesen, 1984) school. Its theoreticians suggest the importance of careful analysis (Ansoff, 1965), of systematically scanning markets for problems and opportunities (Aguilar,

TABLE 1
Strategy-Making Variables
and Their Sources in the Literature

Dimensions	Authors	Types Illustrating Polarities of Dimensions	
		High	Low
Rationality			
Analysis	Andrews (1980) Lindblom (1968) Allison (1971) Steiner (1969) Quinn (1980) Ansoff (1965) Mintzberg (1973a) Aguilar (1967) Andrews (1980)	Planning mode—Mintzberg (1973a) Synoptic mode—Fredrickson (1984)	Impulsive firms—Miller & Friesen (1984) Reactors—Miles & Snow (1978)
Future orientation/planning			
Explicitness of strategy			
Scanning of environment			
Interaction			
Consensus-building vs. individual decision making	Bass (1984) Likert (1961) Pettigrew (1973) Mintzberg (1983)	Adaptive firms—Miller & Friesen (1984) Political arenas—Mintzberg (1983)	Entrepreneurs—Mintzberg (1973a) Schizoid firms—Kets de Vries & Miller (1984)
Bargaining			
Assertiveness			
Proactiveness	Miller & Friesen (1984) Cyert & March (1963) Collins & Moore (1970) Mintzberg (1973a)	Prospectors—Miles & Snow (1978) Entrepreneurial firms—Collins & Moore (1970)	Depressive firms—Kets de Vries & Miller (1984) Stagnant firms—Miller & Friesen (1984) Reactors—Miles & Snow (1978)
Risk taking			

1967; Andrews, 1980), and of methodically planning and articulating unified strategies (Ansoff, 1965; Steiner, 1969). The second school treats strategy making as very much subject to bounded rationality (March & Simon, 1958; Simon, 1947). According to this group of theoreticians, firms do little analysis, emphasize satisficing, not optimizing, and formulate strategies according to a disjointed, intuitive, implicit, and spontaneous process (Cyert & March, 1963; Lindblom, 1959; March & Olsen, 1976; Quinn, 1980). These scholars claim this nonrational approach is essential, given the range and complexity of the problems facing organizations and the attendant political and cognitive limitations (March & Simon, 1958). It relates to Mintzberg's (1973a) adaptive mode, which he claims is present mainly in large, politically fragmented organizations.

The second dimension—*interaction*—has become more widely recognized with the work of Likert (1961), Bower (1970), Pettigrew (1973), March and Olsen (1976), and Wildavsky (1977). These scholars view decisions as outcomes of political and social processes, such as those taking place in Mintzberg's (1983) political arenas. Although political processes may vary greatly in nature and intensity, most organizations are political bodies in which, for better or worse, bargaining, politicking, and consensus-building often come to bear on decisions. This is especially true in large and decentralized companies. Small firms, however, are often so centralized that a single executive makes decisions without much interaction (Collins & Moore, 1970).

The third dimension of strategy making—*assertiveness*—concerns levels of risk taking and the reactivity or proactivity of decisions. Entrepreneurial firms (Collins & Moore, 1970; Mintzberg, 1973a) take bold risks and act on rather than react to their environments. More complex organizations often behave conservatively and act only incrementally and in response to problems (Cyert & March, 1963; Lindblom, 1959; Quinn, 1980).

RELATING STRATEGY MAKING TO STRUCTURE

This section develops some tentative hypotheses about the relationships between strategy making and structure; the intent was simply to guide the analyses by asking some pertinent questions. These hypotheses address the strategy-making and structural dimensions introduced in the last section. Hypotheses 1 through 4 are descriptive and Hypotheses 5 and 6 are normative.

This discussion applies especially to small business organizations—those most likely to face the challenges of increasing scale, market scope, and administrative complexity. Simple, informal, and highly centralized structures and the exclusively intuitive and individualistic modes of strategy making that usually occur within them become inadequate; more formal, specialized, decentralized, and integrated structures, and more interactive and intendedly rational modes of strategy making emerge (Buchelle, 1967; Greiner, 1972; Kimberly & Miles, 1980; Miller & Friesen, 1983; Scott, 1971). The four structural dimensions—integration, formalization, centralization, and complexity—should have important associations with the rationality,

interaction, and assertiveness dimensions of strategy making. Table 2 summarizes these relationships.

Hypothesis 1: Structural integration will be positively associated with rational, interactive, and assertive strategy making.

Integrative liaison devices like task forces and coordinative committees can encourage rationality in strategy making. They precipitate contacts among decision makers that may motivate systematic attempts to develop, scrutinize, and reconcile divergent perspectives. Meetings can elicit factual arguments from managers who have to defend their proposals before peers, which may induce analyses and searches for additional information. Committees may also generate the consensus among executives needed for the development of explicit and unified plans and strategies (Ansoff, 1965; Steiner, 1969). Conversely, intended rationality can influence integration when analysis and planning give rise to the committees that carry out these activities.

Integrative devices can also induce interaction. Committees increase face-to-face contacts among managers. They can be forums for a chief executive officer's (CEO's) sycophants or political battlefields (Pettigrew, 1973), but can also promote bona fide consultation, useful exchanges of information, and worthwhile debate. Interactive modes of strategy making may in turn promote the use of committees and task forces that facilitate the desired collaboration.

Integrative devices can also increase assertiveness, uniting the perspectives of decision makers and emboldening them to make decisive and proactive decisions. Assertiveness may increase with the emergent conviction that derives from consensus (Kets de Vries & Miller, 1984). Conversely, assertive decision making may prompt establishment of committees and task forces to ensure that a multiplicity of viewpoints come together to reduce the hazards of bold ventures.

Hypothesis 2: Formalization will be positively associated with rational and interactive strategy making and negatively associated with assertiveness.

TABLE 2
Summary of Hypotheses

Structural Dimensions	Relationships with Strategy Making		
	Rationality	Interaction	Assertiveness
Hypothesis 1: Integration	+	+	+
Hypothesis 2: Formalization	+	+	-
Hypothesis 3: Centralization	-	-	+
Hypothesis 4: Complexity	+		-
Hypothesis 5: The predicted associations of structure with rationality and interaction will be stronger in successful than in unsuccessful firms.			
Hypothesis 6: The relationships and differences predicted in Hypothesis 5 will be more pronounced in innovative, large firms than in noninnovative, small firms.			

Formalization—the use of formal procedures and job descriptions, cost and quality controls, specialists, and professional technocrats—will be associated with rationality in strategy making. Technocrats and specialists provide organizations with analytical capabilities and expertise needed for systematic and overtly rational modes of decision making. Professional staff have the time and the training necessary to pursue formal, analytical, and systematic methods (Mintzberg, Raisinghani, & Theoret, 1976). Lacking such staff, top executive generalists, who are overworked by day-to-day operating responsibilities, often must eschew analysis and make decisions very quickly and intuitively (Mintzberg, 1973b; Schwenk, 1984). Moreover, formal controls provide quantitative information about operations that motivates analytical follow-ups (Bower, 1970). But rationality can also influence structure, since analysis and planning require specialists and technocrats.

As components of formalization, specialization and technocratization involve many managers in any given issue and thus can induce highly interactive decision making. Bargaining, negotiation, and consensus-building become more common when a firm has many decision makers.

According to Fredrickson, formalization of policies and procedures can reduce assertiveness, increasing “the likelihood that strategic processes will be motivated by reactive (e.g., problem solving) as opposed to proactive (e.g., searching for opportunities) behavior” (1986: 287). People may ignore decision making stimuli that no formal system monitors (Cyert & March, 1963), so their firms respond only to obvious and pressing problems. Proactiveness is extinguished. In fact, formal systems can become so ritualistic that they drive out all creative behavior (Lenz & Lyles, 1983). Moreover, nonassertive firms often embrace formalized and bureaucratic modes of operation (Miller & Friesen, 1984) as these promote efficiency under stable conditions.

Hypothesis 3: Centralization of power for making decisions will be negatively associated with rationality and interaction in strategy making and positively associated with assertiveness in strategy making.

Centralization discourages rationality by placing most of the onus of decision making on top executives, taxing their cognitive abilities and imposing significant time constraints on them. It may thus impede analysis and planning (Mintzberg, 1973b; Schwenk, 1984). Decentralization divides decision making tasks into more manageable bits, reducing collective cognitive limitations and allowing more planned and analytical approaches (Fredrickson, 1986; Thompson 1967). Of course, a rational mode of strategy making may in turn promote an allocation of power to analysts and planners, who are necessary for its execution.

Centralization can diminish a felt need for interaction by inducing conformity in goals and methods via power structures rather than through discussion. In contrast, when many managers have authority to make important decisions, there is scope for conflicting perspectives and consequently more felt need to resolve resulting disagreements. Issues arise that clearly involve multiple managers and departments and engender much political/

adversarial or consensus-building interaction (Pettigrew, 1973; Wildavsky, 1977). An absence of interaction can in turn foster isolation and fragmentation at lower levels of a firm; the resulting powerlessness of middle managers may promote de facto centralization.

Finally, centralization can free top managers to be assertive—venturesome and proactive—because they have the power to commit significant resources to a project (Collins & Moore, 1970; Mintzberg, 1973a). In contrast, extreme decentralization can lead to organizational fragmentation, for it may divide firms into uncooperative constituencies, none of which have enough power or resources to implement their objectives. Stagnation often results (Miller & Friesen, 1984: 94–99). Assertiveness can also create risky crisis situations in which it is necessary to centralize power to quickly mobilize resources (Allison, 1971).

Hypothesis 4: Complexity—a structure's breadth, height, and clerical intensity—will be positively associated with rationality and negatively associated with assertiveness in strategy making.

Clerical employees may contribute to rationality. Some perform administrative functions that free CEOs, reducing their information overload and providing time for analysis, planning, and the codification of strategy. Intendedly rational decision making may in turn create a need for clerical personnel to help in analysis and documentation.

Complexity is also likely to limit assertiveness. It may contribute to organizational fragmentation, which makes it difficult for a firm to achieve the consensus needed for an assertive, proactive product-market strategy. The resulting parochialism and excessive attention to subgoals may promote a reactive, incremental approach (Cyert & March, 1963; March & Olsen, 1976).

Complexity has no obvious implications for interaction. On the one hand, it suggests a large contingent of managers and departments that might have to interact on matters of mutual concern. On the other hand, vertical span and geographical dispersion divide a firm into subunits that may begin to pursue their own goals at the expense of those of the organization (Selznick, 1949). Such interdepartmental isolation reduces interaction.

Implications for Performance

Hypothesis 5: The associations of structure with rationality and interaction predicted by Hypotheses 1 through 4 will be stronger among good than poor performers.

The quality of rationality and interaction in strategy making can benefit from formalized, decentralized, and integrated structures. Managers can analyze, plan, and scan most effectively in structures that provide informative controls, recruit and empower expert staff, and create forums such as committees and task forces to coordinate their efforts. Of course, structural devices can never guarantee critical, multifaceted, and informed decision

making, but they may facilitate it and thus, on balance, enhance performance (Bower, 1970; Miller & Friesen, 1982, 1983).

Conversely, interactive and intendedly rational decision making can encourage well-integrated and highly participative structures. For example, interactive decision making can sometimes combat organizational conflict and fragmentation. Contacts among managers may prompt establishment of the structural integration devices needed to ensure adequate coordination.

The relationships between assertiveness and the structural variables seemed unlikely to have any clear consequences for performance.

Hypothesis 6: The relationships predicted in Hypothesis 5 will be most significant and will contribute the most to performance in firms facing complex administrative tasks, especially firms that innovate a great deal or are large. Thus, the expected differences in the relationships between high and low performers will be more pronounced among innovative and large firms than among noninnovative and small firms.

If firms rarely innovate, bureaucratic devices like formal rules, specialization, cost controls, and coordinative committees alone may ensure adequate performance (Burns & Stalker, 1961; Zaltman, Duncan & Holbek, 1973). Interactive, analytical decision making might be superfluous. But in firms that must often perform complex innovations, structure alone is insufficient; interactive and rational decision making must complement it to facilitate both identification of emerging market threats and opportunities and collaboration among diverse specialists, who must simultaneously consider the repercussions of innovation for marketing, R&D, and production (Galbraith, 1973; Khandwalla, 1977; Lawrence & Lorsch, 1967).

Firm size is another contingency expected to increase the importance of structure's complementarity with rationality and interaction. In small, simple firms, CEOs can manage most things alone. These firms can pursue sophisticated structures and interactive, analytical decision making—both possibly superfluous—sporadically and inconsistently without much consequence (Mintzberg, 1979: 305–314). Larger firms, however, have many managers, departments, and contingencies and can only implement a rational, interactive mode of strategy making within structures having enough controls, staff experts, and liaison devices to support it. This mode is also more necessary to cope with the administrative complexities and environmental contingencies that face large firms (Filley & House, 1969; Greiner 1972; Kimberly & Miles, 1980; Miller & Friesen, 1983; Scott, 1971).

To recapitulate, the more formalized and decentralized a structure, the more prevalent a rational, interactive, unassertive mode of strategy making. The more common the use of integrative liaison devices, the more rational, interactive, and assertive the mode of strategy making. The specified relationships of rationality and interaction with structure will be quite functional, and thus more prevalent among high performers. This may be especially true

in organizations facing highly complex or uncertain conditions—specifically, large firms or those performing much complex product innovation.

METHODS

Sample

The 97 firms in the sample were selected randomly from lists published in *Commerce* and *Les Affaires*. These lists, which are grouped by industrial sectors, represent a fairly exhaustive inventory of significant Quebec firms. The lists embody economically derived constraints of location—the only firms eligible for selection were from the greater Montreal and Quebec City areas. Diversified firms were avoided as they can have different structures and modes of strategy making among their divisions, making company-wide generalizations inappropriate. About 85 percent of the firms were run by Francophones and operated in the French language. Of the 131 firms contacted by telephone, 74 percent participated in the study, which ran from September 1983 until September 1984.

Firms were on average quite small. Sales (\bar{x} = \$31 million, s.d. = \$57 million) and numbers of employees (\bar{x} = 382, median = 100, s.d. = 963) were modest. An owner, a family, a group of partners, or a holding company financially controlled many of the firms. Firms represent a great many industries, including electronics, financial services, home appliances, food and beverages, industrial equipment, lumber, construction, retailing, and mining. No industry represented more than 5 percent of the total sample.

Data Collection

A questionnaire with established measures provided a systematic assessment of structure and strategy making. The research employed both a French and an English version of the questionnaire,¹ thus allowing investigation of a sample large and diverse enough to disclose both the generality and range of applicability of the findings.

Different parts of the questionnaire were administered to the CEO of each firm and to the most senior vice-president or general manager. CEOs completed the questions on strategy making with the help of interviewers, trained by the researchers, who explained the scales during the interviews. General managers and vice-presidents, whom the interviewers visited independently of their visits to the CEO, answered questions about the administrative structures of their organizations. Having two respondents answer different parts of the questionnaire in each organization minimized common method variance.

Measurement

Khandwalla (1977) and Miller (1983) originated all the variables for measuring strategy making and some of the variables for measuring structure—

¹ Four Francophones who held Ph. D.'s in organizational theory and had extensive consulting experience in the Quebec community checked the French translation.

controls, liaison devices, and technocratization. The Appendix describes the scales for these variables. The variables for centralization, formalization, specialization, administrative and clerical ratios, number of sites, mechanization of production, and vertical span came from the Aston research (Inkson, Pugh, & Hickson, 1970). Table 3 reports means, standard deviations, and reliabilities of the scales, where relevant. Interrater reliabilities were not measured in this research as they were established in earlier studies. Khandwalla (1977: 659–663) and Miller (1983: 778) showed the reliabilities of the strategy-making and structural scales to be very good. The scores of the CEOs and their vice-presidents correlated at beyond the .01 level of significance for all variables. Other research has reported the measurement properties of the well-known Aston scales (Inkson et al., 1970; Pugh et al., 1968).

TABLE 3
Means, Standard Deviations, and Reliabilities^a

Variables	Total Sample		Successful		Unsuccessful		Alpha
	Means	s.d.	Means	s.d.	Means	s.d.	
Strategy making							
Analysis	4.12	1.30	4.19	1.11	4.06	1.46	.74
Future orientation/planning	4.29	0.91	4.53	0.87	4.10	0.94*	.65
Explicitness	4.72	1.39	4.95	1.24	4.50	1.57	—
Scanning	4.18	1.36	4.23	1.22	4.20	1.50	.75
Consensus vs. individual decision making	3.25	2.01	3.04	1.99	3.47	2.11	—
Bargaining	2.62	0.53	2.69	0.50	2.57	0.56	—
Proactiveness	4.89	1.27	5.04	1.28	4.68	1.33	.67
Risk taking	3.91	1.60	4.26	1.60	3.74	1.57	.80
Structure							
Liaison devices	32.48	9.39	32.12	9.87	32.43	9.42	.84
Controls	4.85	1.23	4.90	1.10	4.83	1.35	.78
Technocratization	3.60	1.41	3.82	1.54	3.38	1.29	.60
Formalization	5.53	1.83	5.46	1.58	5.62	2.00	.65
Specialization	4.85	1.87	4.77	1.94	5.16	1.74	.80
Centralization	3.01	0.46	2.89	0.48	3.13	0.45*	.82
Number of Sites	5.19	7.96	5.42	9.76	5.15	6.89	—
Mechanization of production	2.95	1.06	3.07	1.02	2.82	1.04	—
Administrative/all personnel	15.17	13.17	13.83	7.21	16.87	17.33	—
Clerical/all personnel	17.99	19.14	17.75	18.64	19.87	20.88	—
Vertical span	6.41	9.63	6.82	11.85	6.38	8.48	—
Performance ^b							
Relative profitability	0.00	1.00	1.00	0.39	-.71	0.63**	
Growth in income	0.00	1.00	0.26	1.29	-.40	0.12**	
Return on investment	0.00	1.00	0.38	1.17	-.59	0.37**	

^aThe total sample and the successful and unsuccessful subsamples included 97, 40, and 48 firms, respectively.

^bPerformance scores were standardized by the means and standard deviations of the total sample.

* $p < .05$, two-tailed t -test.

** $p < .01$, two-tailed t -test.

*** $p < .001$, two-tailed t -test.

Innovation was measured using five year averages of research and development expenses as a percentage of sales. This seems to be a good measure of complex innovation as it gauges real expenditures—major innovations are expensive—rather than potentially distorted, subjective assessments by managers (Zaltman et al., 1973). Number of employees was the measure of firm size.

Several indices of performance were used because the concept is so multifaceted. CEOs were asked to report, on a 7-point scale, how their firms performed over the last five years in terms of long-term profitability, relative to their industry's average. In addition, financial statements supplied actual average annual growth rates in net income and the average rates of return on investment (ROI) for the previous five years. The Pearson correlations of relative profitability with actual growth in net income and ROI were .27 and .35, respectively ($p < .05$), and net income and ROI correlated at $-.36$ ($p < .05$). A principal components analysis of the three performance variables indicated that relative profitability, growth in income, and ROI had loadings of 0.70, 0.66, and 0.83, respectively, on the first component, which had an eigenvalue of 1.62 and accounted for 54 percent of the variance.

Principal Components Analyses of Structure and Strategy Making

Because of the large number of variables and because the hypotheses reflected aggregate dimensions more than individual variables, principal components analyses of structural and strategy-making variables were performed. Table 4 presents correlations among the variables. It was not assumed that common determinants accounted for all of the observed relations in the data, thus principal components factor analysis was used rather than the common factor model. To avoid making inferential assumptions about the structuring of variables and their sources of variation, defined rather than inferred factors were sought. Principal components analysis avoids the problem of factor interdeterminacy in common factor models and is more directly related to information preservation under spatial reduction (Harman, 1967). Orthogonal rather than oblique rotations were performed to avoid ambiguities in interpretation (Green, 1978: 382–383).

Table 5 presents the principal components, henceforth referred to as factors, of all structural variables. These factors—formal integration, decentralization, and complexity—corresponded only roughly to the consensus in the literature concerning structure's components (Hall, 1977; Van de Ven, 1976). A four-factor solution² explained only 10 percent more variance and resulted in a production-system factor that was hard to interpret and was as much a dimension of technology, a contextual element, as it was of structure. In general, most departures from previous factor-analytic findings (Child, 1972; Pugh et al., 1968, 1969; Reimann, 1973) appear to be attributable to studying small firms and including additional variables that measure controls, liaison devices, and technocratization.

² This solution is available from the author.

TABLE 4
Correlations Among All Variables^a

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Analysis																		
2. Future orientation/ planning																		
3. Explicitness																		
4. Scanning																		
5. Consensus vs. indi- vidual decision making																		
6. Bargaining																		
7. Proactiveness																		
8. Risk taking																		
9. Liaison devices																		
10. Controls																		
11. Technocratization																		
12. Formalization																		
13. Specialization																		
14. Centralization																		
15. Number of sites																		
16. Mechanization of production																		
17. Administration/ all personnel																		
18. Clerical/all personnel																		
19. Vertical span																		

^aCoefficients must be greater than .18, .24, and .33, respectively, to reach the .05, .01, and .001 levels of significance. Decimal points omitted.

TABLE 5
Rotated Loadings of Structural Variables

Variables	Structural Factors ^a		
	Formal Integration	Decentralization	Complexity
Controls	.751	.020	-.204
Formalization	.712	-.109	.267
Specialization	.613	-.080	.455
Liaison devices	.612	-.093	.088
Technocratization	.503	.181	-.204
Centralization	-.074	-.740	-.089
Administrative/all personnel	.032	-.700	.088
Mechanization of production	-.069	-.583	.003
Number of sites	.023	.004	.742
Vertical span	-.010	.105	.655
Clerical/all personnel	.048	-.475	-.608
Eigenvalues	2.09	1.67	1.73
Cumulative percent of variance explained	18.98	34.20	49.95

^aLoadings in boldface indicate variables used to interpret factors.

The first factor, formal integration, combines four formalization variables—specialization, formalization, technocratization, and controls—and an integration variable, use of liaison devices. Specialization and formalization variables loaded on the same structuring-of-activities factor as in the Aston research. Technocratization and the use of controls also loaded high on this factor, perhaps because technocrats implement controls and formal policies that in turn require specialists to administer them. In fact, the presence of technocrats in itself reflects a certain level of specialization. Also, specialization and the diversity it involves require many controls and integrative devices. According to Lawrence and Lorsch (1967), integration is necessary to cope with specialization, which explains why the use of liaison devices also loads on the first factor.

The second factor, decentralization of authority, has its primary negative loadings on centralization, the ratio of administrative to total personnel, and mechanization of production. (The ratio of clerical to total personnel has a secondary loading on this factor, but was included in the measure of complexity, where it has its primary loading.) This factor captures intensity of administration—the extent to which upper level managers control an organization. It recalls both the concentration of authority and line control of workflow dimensions of the Aston studies (Pugh et al., 1968, 1969), perhaps combined here because both may be lacking in the small firms and present in the larger firms in this sample.

Finally, the third structural factor, complexity, is related to number of operating sites, vertical span of control, ratio of clerical to total personnel, and to a lesser degree, level of specialization. It conforms to the complexity dimension in the literature (Fredrickson, 1984; Hall, 1977; Jackson & Morgan, 1982: 83; Van De Ven, 1976).

Table 6 presents the results of the principal components analysis of the strategy-making variables. The factors, which correspond to the three dimensions of rationality, assertiveness, and interaction drawn from the literature, need not be discussed at length.

As expected, the rationality factor included the variables of analysis, future orientation and planning, explicitness of strategy, and systematic scanning of the environment. All relate to the synoptic and planning modes and represent systematic, analytical decision making. This approach contrasts with the purely spontaneous, intuitive modes found with severely bounded rationality. The second strategy-making dimension reflects assertiveness, with associated variables being proactiveness and risk taking. The third strategy-making dimension reflects interaction among decision makers, relating positively to bargaining and inversely to consensus versus individual decision making. Together, the factors accounted for 63 percent of the variance and had high and distinct loadings—a so-called simple solution.

Analysis

Hypotheses 1 to 4 were tested via correlational (Table 7) and multiple regression (Table 8) analyses of the factors and individual variables. The factors provide more parsimonious, if more aggregate, findings that reveal the gross patterns in the data. The correlational analyses present the simple relationships among the factors and variables, and the multiple regressions simultaneously control for the effects of all the structural factors on strategy making and disclose the collective variance explained.

To test whether the relationships between strategy and structure were stronger among successful firms (Hypothesis 5), the sample was divided according to firms' performance and the regression results were compared using Chow and Z-tests. To be classed as successful (or unsuccessful), firms

TABLE 6
Rotated Loadings of Strategy-Making Variables

Variables	Strategy-Making Factors ^a		
	Rationality	Assertiveness	Interaction
Analysis	.835	.068	-.085
Future orientation/planning	.685	.296	.070
Explicitness	.762	.135	.058
Scanning	.558	-.107	.141
Proactiveness	.209	.808	.052
Risk taking	-.029	.850	-.017
Bargaining	-.081	.153	.842
Consensus vs. individual decision making	-.280	-.278	-.710
Eigenvalues	2.19	1.60	1.25
Cumulative percent of variance explained	27.35	47.31	62.95

^aLoadings in boldface indicate variables used to interpret factors.

had to score above (or below) the median on all three performance variables. To determine if the match between strategy making and structure was more important to performance in groups of innovative and larger firms (Hypothesis 6), regression results were also compared for high and low performing subgroups of both innovative and noninnovative and large and small firms.

RESULTS AND DISCUSSION

This section presents the findings in order of Hypotheses 1–4. To enhance the coherency of the analysis, I also examine the implications for performance postulated in global Hypothesis 5.

Formal Integration

This factor combines the customary variables of formalization and integration. Hypotheses 1 and 2 made distinct cases for relationships between integration and formalization and aspects of strategy making. Although the rationales differed, the expected positive relationships of the two structural dimensions with rationality and interaction were expected to be the same. The analyses confirm this. The correlational and regression analyses of Tables 7 and 8 show that the formal integration factor is significantly

TABLE 7
Pearson Correlations of Structural Variables
and Factors with Strategy-Making Factors

Structural Factors and Variables	Strategy-Making Factors		
	Rationality	Assertiveness	Interaction
Formal integration			
Controls	.283**	.070	.283**
Formalization	.239*	-.068	.097
Specialization	.255**	-.111	.273**
Liaison devices	.572***	.245*	.131
Technocratization	.099	.211*	.259**
Decentralization			
Centralization	-.045	-.221*	-.182*
Administrative/all personnel	.013	-.092	-.151†
Mechanization of production	.165†	.134	.071
Complexity			
Number of sites	-.002	.064	.045
Vertical span	.092	-.033	-.034
Clerical/all personnel	.087	-.061	.015
Aggregate factors			
Formal integration	.437***	.111	.326***
Decentralization	.052	.218*	.192*
Simplicity	-.086	.039	-.019

†p > .10

*p > .05

**p > .01

***p > .001

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TABLE 8
Multiple Regressions of Strategy Making
on Structural Factors

Structural Factors ^a and Variables	Standardized Regression Coefficients			R ²	F	Chow's F	
	Integration	Decentralization	Complexity			Successful vs. Unsuccessful	
Rationality							
Total sample	.437***	.052	.086	.201	7.820***		
Successful	.443**	.274†	.205	.312	5.435**		
Unsuccessful	.424**	−.092	−.040	.187	3.364*	1.85	
Analysis							
Total sample	.420***	−.081	.180†	.215	8.413***		
Successful	.481***	.031	.445**	.411	8.153***		
Unsuccessful	.376**	−.158	−.020	.163	2.860*	3.74*	
Future orientation/planning							
Total sample	.292**	.252**	.012	.149	5.380**		
Successful	.312*	.416**	.236†	.334	5.860**		
Unsuccessful	.304*	.062	−.310*	.187	3.377*	8.06***	
Explicitness of strategy							
Total sample	.259*	.046	.025	.070	2.298†		
Successful	.317*	.284†	.061	.183	2.620†		
Unsuccessful	.221	−.118	−.008	.062	0.964	2.79*	
Scanning							
Total sample	.405***	.145	.043	.187	7.041***		
Successful	.288†	.313*	−.041	.179	2.540†		
Unsuccessful	.477***	.105	.098	.253	4.962**	4.46**	
Interaction							
Total sample	.326***	.192*	.019	.143	5.190**		
Successful	.622***	.105	.137	.410	8.332***		
Unsuccessful	.160	.172	−.095	.067	1.049	2.16	
Consensus vs. individual decision making							
Total sample	−.324***	−.162†	.028	.132	4.665**		
Successful	−.499**	−.107	−.106	.267	4.252*		
Unsuccessful	−.230	−.144	.144	.096	1.554	3.40*	
Bargaining							
Total sample	.267**	.130	.085	.096	3.245*		
Successful	.605***	.071	.219	.409	8.059***		
Unsuccessful	.094	.086	−.045	.019	0.281	6.14***	
Assertiveness							
Total sample	.111	.218*	−.039	.061	2.021		
Successful	−.088	.217	.085	.067	0.861		
Unsuccessful	.280*	.135	−.221	.146†	2.515	2.50†	
Proactiveness							
Total sample	.268**	.139	−.063	.095	3.218*		
Successful	.082	.148	.006	.028	0.340		
Unsuccessful	.441**	.072	−.135	.215	4.021*	2.98*	
Risk taking							
Total sample	.086	.235*	.051	.065	2.140		
Successful	−.107	.269†	.169	.124	1.651		
Unsuccessful	.264†	.159	−.189	.132	2.238†	6.60***	

^aTotal *n* = 97, successful *n* = 39, unsuccessful *n* = 48; rationality, interaction, and assertiveness are aggregate factors.

†*p* < .10

**p* < .05

***p* < .01

****p* < .001

related to the aggregate rationality and interaction factors of strategy making as well as to most of their component variables.

The correlations of Table 7 show that the variable for liaison devices has the strongest relationship with the rationality factor. Controls and specialization, however, have similar significant relationships with rationality and interaction. Technocratization and formalization have more selective associations. Perhaps liaison devices are so closely associated with rationality because they give rise to a critical exchange of ideas and information that motivates further probing and analysis. Also, the rational approach may itself prompt the formation of special task forces, planning committees, and the like. In contrast, although some aspects of formalization can increase analysis and interaction, others can reduce it, compartmentalizing decision making and rendering it more rigid and automatic (Lenz & Lyles, 1983; Wildavsky, 1977).

Formal integration did not relate significantly to the assertiveness factor, except in the unsuccessful subsample, indicating perhaps that market needs rather than structure determine proactiveness and risk taking in successful firms.

In summary, for the total sample, formal integration, especially the use of liaison devices, related very consistently and significantly to rationality and interaction, but not to assertiveness.

Hypothesis 5 proposed stronger relationships of integration with rationality and interaction in successful firms than in unsuccessful ones. The Z-test statistics comparing the regression coefficients of the successful and unsuccessful subsamples (Table 8) are significant at .05 for both interaction variables and also for the aggregate factor.³ In general, Z-tests of these predicted differences were significant for interaction, but not for rationality.

A close relationship between integration and interaction may mean that structural devices produce high decision making involvement among managers. This can combat the dangers of one-person domination in small firms. In contrast, intended rationality might correlate with formal integration without doing much for performance. Analysis and planning might be ineffective without the commitment and participation of knowledgeable managers.

Decentralization of Authority

Decentralization of decision making power was hypothesized to be positively associated with rational and interactive strategy making, and negatively associated with assertiveness. Tables 7 and 8 indicate that the findings were not as uniformly significant as for the integration factor. Decentralization related to the overall interaction and assertiveness factors, but not to rationality. It also correlated with two individual variables, future orienta-

³ Because specific differences were hypothesized for these factors, the results of Z-tests were more pertinent to these hypotheses than the results of the Chow tests, which pertain to the whole equations and thus include relationships with other independent variables. A later subsection refers to the results of the Chow tests.

tion and risk taking. The positive association of decentralization with risk taking was unanticipated. It may be that risk taking is less hazardous in the context of a decentralized structure, where decision making is a participative endeavour, than in a centralized structure, where the impulses of an all-powerful CEO can initiate very dramatic and dangerous programs (Kets de Vries & Miller, 1984).

Hypothesis 5 proposed that the relationships of decentralization with rationality and interaction would be stronger in successful than in unsuccessful firms. This may be true for rationality, but it is not true for interaction. Although Z-tests for differences between the performance groups were not significant, the aggregate rationality factor and three of its four component variables—future orientation, explicitness of strategy, and scanning—only related significantly and in the predicted direction to decentralization among good performers. In the unsuccessful firms, decentralization did not relate to any of the strategy-making variables or factors. Thus, the significant relationships between decentralization and rationality might indeed be functional. Decentralization can parcel out the tasks of analysis, loosening strictures of bounded rationality and allowing deliberation and painstaking decision making (Fredrickson, 1986). It can procure the kind of broad managerial involvement in analysis, planning, and scanning that increases the appropriateness of decisions and marshals a political commitment facilitating their implementation.

It is possible that these implications for performance failed to emerge for the relationship between decentralization and interaction because the two factors can substitute for each other. They need not occur together if one may replace the other.

Complexity

Hypothesis 4 suggested that structural complexity would correlate positively with rationality and negatively with assertiveness of strategy making. This prediction was neither borne out for the strategy-making factors nor for most of their component variables. The multiple regression analyses of the total sample revealed only one marginally significant relationship ($p < 0.10$), which might well be spurious, since it stands alone among so many insignificant results.

The insignificant findings for the complexity factor may result from the ambiguous implications of its elements. Number of sites and ratio of clerical to total personnel may have few consequences for decision making. Clerks, for example, might stimulate analysis or might foster an automaticity of functioning that is anathema to analysis.

Modest support is present for Hypothesis 5, which predicted different relationships between complexity and rationality in high- and low-performing groups of firms. The successful subsample shows the expected positive relationships of analysis and future orientation to structural complexity, and the unsuccessful subsample shows a negative relationship between future orientation and complexity—the opposite of what was expected for successful

firms. Typically, complex firms require more time to adapt (Hedberg et al., 1976) and thus need longer time horizons in decision making than firms with simple structures.

Performance and Administrative Challenge

Hypothesis 6 argued that an appropriate match between strategy making and structure is more necessary for success when firms are large and when their rates of complex product-market innovation are high. If so, the predicted relationships of rationality and interaction with structural sophistication might hold more strongly in innovative firms than in noninnovative firms. Moreover, given their functional nature, the predicted relationships will be stronger for successful than for unsuccessful innovators. These differences are unlikely to be as pronounced in groups of noninnovative firms. As bargaining and explicit strategies were not expected to be of help in an innovative setting with all of its uncertainties, these variables were dropped from the analyses.

The regressions of Table 8 were recomputed for innovative and non-innovative subsamples of firms and for successful and unsuccessful subgroups of each.⁴ The sample was bifurcated to yield approximately equal subsamples. The average R^2 for the regressions is 0.256 for the whole innovative subsample versus only 0.140 for the whole noninnovative subsample. Chow tests comparing their overall similarity do not demonstrate these regressions to be significantly different, probably because of the small size of the subsamples, but the general tendency is clearly for the equations to be more predictive among innovative than among noninnovative firms.

Next, the subsamples of innovative and noninnovative firms were further split into two mutually exclusive subgroups according to the mean of profitability over five years relative to that of competitors. For successful innovators, the average R^2 was 0.437; for unsuccessful innovators, the average R^2 was only 0.253. This last figure is somewhat misleading because some significant betas were in a direction opposite to that predicted by the hypotheses. Chow tests revealed three of the four pairs of regressions to be significantly different at beyond the 0.10 level, just as expected. In contrast, regressions for the subgroups of successful and unsuccessful noninnovators did not differ significantly. The R^2 s were 0.254 and 0.206, respectively, and none of the Chow tests reached the 0.10 level of significance. Again the results, though tentative, were in line with predictions.

The hypotheses also designated size of a firm as a contingency factor that could enhance the relationships between strategy making and structure, and stated both that successful, large firms would have stronger relationships in the predicted direction than unsuccessful, large firms and that such performance-related differences would be less pronounced among small firms.

The sample was bifurcated according to firm size, measured by numbers of employees, into approximately equal subsamples. The average R^2 for the

⁴ These results, which do not appear because of space constraints, are available from the author.

regressions⁵ was 0.247 for the small firms and only 0.147 for the large firms. Although the Chow tests did not show these regressions to be significantly different, the direction of the difference was surprising. Despite predictions that large size would complicate administrative tasks and thus mandate high levels of complementarity between strategy making and structure, the alignment of variables was tighter in the small firms.

The substantial influence that the personalities of top executives have been shown to have on both strategy making and structure in small firms (Miller, Kets de Vries, & Toulouse, 1982; Miller & Toulouse, 1986) may account for this very tentative result. In small firms, the top executive's locus of control, need for achievement, and flexibility correlated very strongly with structural and decision making variables; these relationships were weaker in larger firms (Miller & Droge, 1986; Miller & Toulouse, 1986).

The analyses also showed that strategy making and structure were more strongly associated in the predicted directions in the successful than in the unsuccessful subgroups of the large and small subsamples. Specifically, for the small firms, R^2 s were 0.415 and 0.237, respectively, for the successful and unsuccessful subgroups. For the large firms, the corresponding figures were 0.285 and 0.223. The performance-related differences are in fact understated because betas that are significant in directions opposite to those predicted enhanced the coefficients for the unsuccessful subgroups. For the small firms, the Chow tests show no significant differences between the regressions of the successful and unsuccessful subgroups. For the large firms, however, two of the four tests are significant at beyond the 0.05 level. Thus, as suspected, the alignment of structural factors with variables such as analysis and future orientation may be especially important for performance in large, and therefore more complex, firms.

Aggregate Findings

The multiple regressions accounted for a significant proportion of the variance in strategy making for the majority of cases (Table 8). This was especially true in the successful firms, where the R^2 averaged 30.3 percent for the predicted equations—all equations except those pertaining to proactiveness and risk taking, which were not expected to influence performance. This was almost twice the figure for the unsuccessful firms, where the corresponding average was 15.3 percent. This is an impressive difference, considering that all the variance explained was in the predicted direction for the successful firms, but not for the unsuccessful ones. The Chow tests of Table 8 reveal that most of the multiple regressions differ between the successful and unsuccessful subsamples at beyond the .05 level. Moreover, the analysis of the subgroups based on innovativeness and size indicated that such performance-related differences were greatest in innovative and large organizations. Overall then, there is substantial support for many of the hypotheses.

⁵ These results are also available from the author.

CONCLUSIONS

The findings show numerous significant associations between strategy making and structure, particularly for the factors of formal integration and decentralization and among successful and innovative firms.

Specifically, formal structural integration related to rationality and interaction in decision making, especially in successful and innovative firms, but not to assertiveness, which might be highly influenced by CEOs' personalities (Miller & Toulouse, 1986). Integration seems to be vital in setting the stage for decision making: it influences the types of participants, their ranges of specialization, and the forums in which they collaborate. It may also be a product of intended rationality and interaction in making strategy. Decentralization related less significantly to strategy making and was mainly significant in successful firms. Finally, complexity had almost no significant associations with strategy making, the consequences of its component variables being particularly obscure. In general, the relationships were highest among good performers and seemed to contribute the most to success in the larger and more innovative firms in the sample.

These findings appear to support a recent emphasis among organizational scholars: the search for *gestalts* or configurations (Hambrick, 1984; Miller & Friesen, 1984; Tushman & Romanelli, 1985). These scholars have taken organizations to be constructed out of mutually reinforcing rather than independent elements. Aspects of strategy, structure, and environment configure to form integrated wholes whose parts support and take significance from the entire configuration. The present research indicates that important relationships among the variables composing structure and strategy making indeed exist and often have crucial implications for performance, especially under conditions of great administrative challenge. There seems, then, to be a systemic quality to organizations that rewards certain types of consistency: the state aspects of structure must be aligned with the process aspects of strategy making.

Although this area of investigation is young, these preliminary findings seem of practical importance. Designers of organizations must ensure complementarity among elements of structure and strategy making. Rational and interactive modes of strategy making seem to be most appropriate in formally integrated and decentralized structures, and achieving such a match is most critical when complex product innovation or large size complicate an administrative task. When a firm is very small or does little innovation, it may have a good deal of leeway in selecting and matching strategy making and structure.

Clearly, further research is needed. Previous investigators have paid much attention to relationships between strategy and structure and between structure and environment. It would be useful to examine how strategy-making behavior moderates these relationships and to investigate the relationships that rationality, interaction, and assertiveness in strategy making have with strategic content and the nature of an environment. It may also be

worthwhile to discover the strategy-making behavior associated with the most successful matching of strategy and structure in different environments.

Subsequent researchers might do well to bear in mind some of this study's limitations. Most firms in the sample operated in Quebec and were under Francophone management; findings might not generalize to other cultures. Because Francophone companies were preponderant in the sample, it was impossible to establish statistically whether Anglophone and Francophone enterprises differed in the relationships among the variables. No obvious differences could be found, which is not surprising in light of the conclusions of most multicultural studies. In their review of these studies, Jackson and Morgan concluded that "with several exceptions, cultural differences do not affect the relationships among the structural characteristics, or those between structure and size, or technology and autonomy" (1982: 92). This was especially true when comparing similar cultures. All the Francophone firms operated in a North American business context, which might evoke some conformity (Toulouse, 1980). Francophone firms competed against their Anglophone counterparts. Also, many Francophone managers were trained in business schools that impart American approaches to management.

Another limitation is that this study's conjectures, and perhaps its findings, apply mainly to small firms. Also, the investigation was cross-sectional, with the performance data reflecting past conditions and the strategy-making and structural variables measuring current circumstances. Therefore, the results could stand confirmation by longitudinal investigations, which might show the direction of the causal influences between strategy making and structure, their consequences for performance, and their relationships to environment and strategy.

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APPENDIX

The centralization, specialization, and formalization scales used were those of Inkson and colleagues (1970). Descriptions of the other scales follow. Responses for all items were measured on 7-point Likert scales, except where indicated.

Structural variables. Three items measured technocratization, firms' deployment of professional managers and technocrats. The first, measuring reliance on personnel in decision making, was scaled 1 = great reliance on personnel with experience and common sense, 4 = some of both, 7 = great reliance on specialized, technically trained line and staff personnel. The second, measuring the required level of formal technical competence of first-line supervisors, was scaled 1 = no training beyond high school (as in supermarkets), 4 = varies considerably by functional area, 7 = a minimum of a bachelor's degree with specialization (as in consulting or engineering firms). The third, measuring percentage of professionals such as engineers, scientists, and accountants employed, was scaled 1 = few (less than 1 percent of those other than first-line production workers), 4 = about 5 percent, 7 = many (over 20 percent of employees other than first-line production workers).

The following two composite items measured *liaison devices*. The extent to which firms used integrative mechanisms to assure compatibility among decisions in one area (e.g., marketing) with those in other areas (e.g., production) was measured on scales ranging from 1 = used rarely to 7 = used very frequently for responses concerning the following three items: (1) interdepartmental committees set up to allow departments to engage in joint decision making; (2) task forces, temporary bodies set up to facilitate interdepartmental collaboration on a specific project; (3) liaison personnel whose specific job it is to coordinate the efforts of several departments for purposes of a specific project. The extent to which participative, cross-functional discussions characterized decision making at top levels was measured on a scale ranging from 1 = rare use of committees or infrequent informal collaboration to 7 = frequent use of committees or informal interdepartmental collaboration in response to the following three items: (1) product or service decisions concerning production, marketing, and R&D strategies; (2) capital budget decisions—selection and financing of long-term investments; (3) long-term strategies (growth diversification, etc.) and decisions related to changes in a firm's operating philosophy. An additional item was scaled from 1 = each department makes decisions more or less on its own, without regard to other departments, to 7 = there is a great deal of departmental interaction on most decisions.

Six items measured firms' employment of control devices to gather information about performance. Responses were scaled from 1 = used rarely or for small part of operations to 7 = used frequently or throughout the firm, for items concerning use of: (1) a comprehensive management control and information system, (2) cost centers for cost control, (3) profit centers and profit targets, (4) quality control of operations via sampling and other techniques, (5) cost control by fixing standard costs and analyzing variations, (6) formal appraisal of personnel.

Mechanization of production was measured by one item on a 5-point scale ranging from 1 = manual production (e.g., making custom furniture) to 5 = fully automated production (e.g., refining oil).

In addition, respondents were asked the following four questions: (1) What is the number of operating sites (plants and branches) of the firm? (2) What is the proportion of managerial personnel to total personnel (include all levels of management with foremen)? (3) What is the proportion of clerks to total personnel? (Clerks are staff in all functional areas who are not directly engaged in making, designing, or selling the product.) (4) How many levels are there in the organization? (That is, count the number of levels in the longest line between direct workers and the chief executive—include both these levels—in the production or service function.)

Strategy making. Four items measured the level of analysis involved in decision making: (1) application of operations research techniques, such as linear programming and simulation, to make major production, marketing, and financial decisions; (2) periodic brainstorming by senior management groups for novel solutions to problems; (3) formalized, systematic search for and evaluation of opportunities for acquisitions, new investments, new markets, etc.; (4) use of staff specialists to investigate and write reports on major decisions. Response formats were scaled 1 = used rarely to 7 = used frequently. An additional item was scaled from 1 = choices among strategic alternatives tend very often to be made quickly and without precision as time pressures are often substantial to 7 = much thought and analysis enter into key decisions.

Two single-response questions and one composite question measured future orientation. The first was scaled from 1 = decisions aimed at the resolution of crisis are most common to 7 = decisions aimed at exploiting opportunities in the environment are most common. The second was scaled 1 = there is a bird-in-the-hand emphasis on the immediate future in making management decisions, 4 = medium-term orientation, 7 = long term (over five years) goals and strategies are emphasized. The composite question, measuring the extent to which firms carried out planning activities, was scaled from 1 = very rarely or haphazardly to 7 = very frequently and intensively, regarding use of (1) long-term forecasting of sales, profits, and the nature of markets; (2) long-term forecasting of the technology relevant to products and services offered by firms; (3) planning of long-term investments.

Explicitness of strategy was measured by one item on a scale ranging from 1 = administrative and product/market strategies have not been explicitly conceptualized to 7 = strategies are well and precisely conceptualized and guide the *modus operandi* and decisions.

The extent to which firms used scanning devices to gather information about their environments was measured on scales ranging from 1 = not ever used to 7 = used extremely frequently regarding use of: (1) routine gathering of opinions from clients; (2) explicit tracking of the policies and tactics of competitors; (3) forecasting sales, customer preferences, technology, etc.; (4) special market research studies.

Use of consensus versus individual decision making was measured by one item scaled from 1 = we employ consensus-oriented team decision making to 7 = decisions are made by managers individually without much interaction.

The importance of bargaining and discussion for middle and top management in the resolution of problems, conflicts, or decisions was measured by one item on a 3-point format scaled 1 = not very important, 2 = moderately important, 3 = extremely important.

Proactiveness was measured by three items. The first was scaled from 1 = there is a strong tendency to follow competitors in introducing new things or ideas to 7 = we always try to be ahead of competitors in product novelty or speed of innovation and usually succeed. The second was scaled from 1 = we favor the tried and true to 7 = we are growth, innovation, and development oriented. The third was scaled 1 = we try to cooperate and coexist with competitors to 7 = we pursue a tough "undo-the-competitors" philosophy.

Risk taking was measured by two items. The first was scaled from 1 = there is a strong proclivity toward low-risk projects (with normal and certain rates of return) to 7 = the firm has a strong proclivity for high-risk projects (with chances of very high return). The second was scaled from 1 = due to the nature of the environment, it is best to explore it gradually via timid, incremental behavior to 7 = bold, wide-ranging acts are viewed as useful and common practice.

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STRUCTURAL AND PERCEPTUAL INFLUENCES ON INTRAINDUSTRY STRATIFICATION

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This paper argues (1) that intraindustry stratification is a function of both structural parameters and top managers' responses to perceptions of their environments, and (2) that the notion of strategic groups can meaningfully extend to corporate and collective levels of strategy. We explored relevant research questions using survey data from 114 of the largest firms in the financial services industry. The results suggest that variables measuring managerial perceptions are useful predictors of intraindustry stratification and that the strength of the predictor variables differs across levels of strategies. Supragroupings of firms with similar configurations of strategies across levels also emerged.

Recent approaches linking theories of industrial organization and strategic management emphasize the effects of intraindustry structures on the dynamics of organizational adaptation and the profitability of firms (Dess & Davis, 1984; Hatten & Schendel, 1977; Oster, 1982; Porter, 1979, 1980). These investigators have proposed describing sets of firms pursuing similar strategies as strategic groups (Hunt, 1972). Such groups provide an important structural context for strategy formulation by creating barriers to mobility that discourage new entrants, thereby influencing the profitability and growth of group members (Caves & Porter, 1977).

Most empirical investigations of strategic groups remain problematic for two reasons: (1) they tend to rely exclusively on measures of industry structure and *ex post* evaluations of strategy inferred from financial data, thereby dismissing considerations of perception and intent in determining the process of intraindustry stratification; and (2) they tend to emphasize the competitive aspects of strategy making at the single-business level, ignoring the competitive and cooperative implications of corporate and collective strategizing (Astley & Fombrun, 1983; Bourgeois, 1980).

This study proposes two extensions intended to complement the typical structural approach to research on strategic groups. First, we suggest that *environmental posture*—a firm's perceptual stance toward its external environment—be considered in conjunction with structural parameters as explaining intraindustry stratification. This would permit examination of in-

The helpful comments of Graham Astley, Jane Dutton, Ari Ginsberg, and three anonymous reviewers are gratefully acknowledged.

tended strategy in the determination of strategic groups (Dess & Davis, 1984). Second, we extend stratification to include an assessment of different groupings that emerge at the business, corporate, and collective levels of strategy. Ultimately, it may be possible to classify firms as belonging to supragroupings defined by configurations of strategies across different levels.

INTRAINDUSTRY STRATIFICATION

According to Porter,

an industry can . . . be viewed as composed of clusters or groups of firms, where each group consists of firms following similar strategies in terms of the key decision variables . . . Firms within a strategic group resemble one another closely and, therefore, are likely to respond in the same way to disturbances, to recognize their mutual dependence quite closely, and to be able to anticipate each other's reactions quite accurately (1979: 215).

In an extension of Bain's (1956) model of entry barriers, Caves and Porter (1977) suggested that various mobility barriers induce these intraindustry groupings. Virtually all of the subsequent research on mobility barriers emphasizes the effects of structural constraints on stratification. However, an analysis that relies exclusively on structural factors is likely to fall short of capturing the full behavioral complexity of stratification. More specifically, if top managers form strategies with environmental threats and opportunities in mind (Andrews, 1971), their perceptions of their organizations' environment—that is, their environmental posture—should influence strategic groupings. Therefore, one predictor of the composition of strategic groups might be the degree to which member firms take similar environmental postures. We could then compare strength of shared environmental perceptions and structural variables in explaining strategic groupings of firms. As Caves and Porter themselves suggested, a firm normally “conjectures about industry conditions . . . thus, the entry barriers we observe are partly structural but at least partly endogenous” (1977: 241).

A related issue deals with choices of data sources and measurements. Structuralists typically rely on archival data to measure relevant criteria for groupings and use these *ex post* measures to infer the strategies and strategic groupings of organizations. However, exclusive reliance on these structural measures probably does not describe the actual groupings in which unsuccessful firms may have attempted to compete. Unanticipated outcomes, wrongly viewed as realized strategies, could also resemble the consequences of wholly dissimilar, intended strategies and cause the classification of firms into inappropriate strategic groups. To capture perceptual factors relating to strategic intent, therefore, it may be necessary to complement archival data sources with top managers' responses to questionnaires, surveys, or interviews.

Finally, a dominant orientation to the dynamics of industry competition has also encouraged a focus on strategic groupings of firms at the single-business level. However, groupings derived from an exclusive reliance on

measures of business-level strategy may actually misspecify the locus of competition, since the relevance of particular mobility barriers may vary widely across levels of strategy. This study therefore extended the notion of strategic groups by including corporate and collective dimensions of strategy. Ultimately, it may prove useful to conceptualize strategic groups as configurations of strategies across levels, reflecting not only the typical competitive aspects of business strategies, but also the broader corporate and collective strategies designed to maximize overall corporate welfare.

Research Questions

Since this study's point of departure was to include measures of top managers' environmental perceptions, it would be useful to explore which structural or perceptual variables better predict strategic groupings, not only for dimensions of business-level strategy, but also for corporate and collective dimensions. This suggests the following:

Question 1: For a given dimension of strategy, does a firm's environmental posture, size, or institutional function best predict membership in a strategic group?

It is also possible to compare the relative predictive power of a single structural or perceptual factor across dimensions of strategy—in other words, to try to assess the robustness of a mobility barrier in terms of the consistency of its importance across different dimensions of strategies.

Question 2: Do structural and perceptual factors differ in relative importance, direction, and significance in explaining strategic groupings for different dimensions of strategy?

Whereas the first question referred to the relative strength and composition of predictor variables for each of the individual dimensions of strategy, and the second question addressed the strength of individual variables across dimensions of strategy, another area to explore was the composition of organizational groupings across dimensions of strategy. We speculated as to the existence of sets of firms pursuing configurations of strategies, spanning business, corporate, and collective levels. Miller and Friesen (1984) spoke of the plausibility of such configurations within organizations. If strategic groups are defined as firms following similar strategies at the business level, firms following similar sets of strategies across levels can be considered strategic supragroups.

Question 3: Are there sets of firms pursuing similar configurations of strategies that span dimensions of strategy?

METHODS

Data

To explore the correlates of industry stratification in greater detail, we chose the top 300 financial service firms with assets of \$1 billion or more, considering them a microcosm of the national community of U.S. financial intermediaries. The cutoff point for selection, although arbitrary, reflected a

juncture of two considerations: (1) the need to define a sufficient number of participants in the study within each of three principal sectors, commercial banking, thrift associations, and financial service firms; and (2) the high degree of concentration in each sector; within commercial banking, for example, the top 50 of over 14,000 banks controlled 66 percent of all bank assets in 1980.

The industry conditions and trends facing the financial services community provide a valuable context for assessing the usefulness of the approach to intraindustry stratification proposed in this study. The Depository Institutions Deregulation and Monetary Control Act of 1980 ushered in a new attitude towards competition in financial services. Other significant developments included the lifting of Regulation Q, which eliminated ceilings on interest rates, and the federal government's tacit approval of various loopholes for circumventing restrictions on (1) interstate banking—originally prohibited by the McFadden Act of 1927—and (2) mixing commercial and investment banking, originally prohibited by the Glass-Steagall Act of 1933.

In addition to the important changes in the political and regulatory environment, technological advancements in electronic funds transfer systems, automatic teller machines, and point-of-sales systems have also influenced the financial services community. Given the increasingly interdependent competitive setting and the potential changes in barriers to structural mobility, financial services appears to be an excellent industry in which to examine strategic groups as (1) functions of both structural position and top managers' environmental perceptions, and (2) encompassing a broad range of strategies, from product-market competition to acquisition activity, the formation of interorganizational linkages, and lobbying.

In a single mailing in 1982, questionnaires were sent to the chief executive officer (CEO) of each of the 300 firms. Questionnaires came back from 114 firms, a 38 percent response rate; 113 of these were usable. The chairman/CEO, president, or a person directly reporting to the president and involved in corporate planning completed 84 percent of the questionnaires. Table 1 presents a breakdown of the responding firms' characteristics. No serious problems of nonrespondent bias were evident. Relatively small firms in this sample, although less likely than relatively large firms to respond, are well-represented in terms of absolute numbers. Response rates and numbers for the various types of institutions are also roughly equivalent.

Measurements

Variables were operationally defined on the basis of responses to the questionnaire; the Appendix describes these measures in detail. Table 2 shows means, standard deviations, and the intercorrelation matrix for all variables.

Structural position. We developed two measures representing structural mobility barriers: size and institutional function.¹ Porter (1979) and Newman

¹ These are, of course, by no means the only possible barriers; other potential choices, such as technological barriers, however, are typically poorly defined and difficult to measure, and therefore subject to controversy. Our purpose was not to derive a full set of structural barriers, but to develop a representative subset.

TABLE 1
Characteristics of Responding Firms

Characteristics	Number of Useable Questionnaires Returned	Percentage of Questionnaires Returned
Institutional function		
Commercial banks	39	43
Thrifts, mutual savings banks, and savings and loan associations	45	33
Financial service firms, brokerage houses, investment banks, life insurance firms, and general financial service firms	29	39
Size in total assets		
\$20 billion +	12	63
\$5 – 20 billion	34	64
\$3 – 5 billion	24	46
\$1 – 3 billion	43	24
Totals	113	38

(1978) argued that economies of scale and other barriers to mobility are principally functions of a firm's size and restrict the strategic options of a firm by virtue of conferring membership in a strategic group. Size can therefore serve as a proxy for a variety of economic impediments to mobility. Independent of scale effects, however, size may also induce a different sort of mobility barrier. Inertial forces, known to be functions of size, frequently inhibit organizational adaptation (Stinchcombe, 1965). Porter's use of size thus suggested using a proxy for a structural barrier to mobility that is both economic and social. We measured size as total firm assets. Either logarithmic transformations or ordinal groupings can compensate for skewed distributions (Kerlinger, 1973). We used a four-category ordinal variable to group firms by total assets as follows: (1) \$1–3 billion, (2) \$3–5 billion, (3) \$5–20 billion, and (4) greater than \$20 billion. Table 1 reports the distribution of responding firms in terms of size and function.

A second structural mobility barrier that may constrain adaptation is a firm's institutional function—the traditional industry definition of an organization. Previous research indicates that expectations regarding the behavior of an organization in its institutional environment hinder mobility (Zucker, 1983). Thus, a firm that has developed a stable set of institutional relations might find itself constrained from change, and the societal function it serves could thereby influence the subsequent stratification of its industry. In this study, we differentiated commercial and thrift institutions and distinguished both from a third category of intermediaries involved in the delivery of financial services that included brokerage houses, investment banks, and life insurance companies.

Environmental posture. Following the basic model of strategy formulation Andrews (1971) proposed, we defined posture in terms of top managers'

TABLE 2
Descriptive Statistics^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10
1. Size	2.16	1.02										
2. Environmental posture (technological)	5.19	1.20	-18									
3. Environmental posture (political)	3.81	1.71	29	10								
4. Environmental posture (competitive)	2.76	1.39	24	-04	36							
5. Generalism	2.30	1.41	-03	33	-13	01						
6. Internal expansion	2.43	1.09	38	04	38	20	07					
7. External expansion	3.07	1.62	24	03	01	03	35	23				
8. Links with banks	1.56	1.62	09	19	27	08	02	35	07			
9. Links with thrifts	1.54	1.83	-31	15	-23	17	04	-05	07	18		
10. Links with financial service firms	0.82	1.24	09	-10	05	19	-03	01	-03	23	02	
11. Collective influence	3.61	0.83	-19	17	-14	04	07	-04	13	00	17	-18

^aAll correlations ≥ 16 are significant at $p < .05$; decimal points omitted.

perceptions of an environment as offering opportunities or threatening the activities of their firms. On the basis of detailed reviews of the financial services industry (Teplitz, 1976), we selected three environmental dimensions as particularly relevant to financial institutions and measured these on 7-point scales. Highly specific single-item measures captured each firm's perceptions of opportunities or threats in its (1) technological, (2) political, and (3) competitive environments. High scores indicated perceptions of high opportunity.²

Strategy. Seven measures, spanning the business, corporate, and collective levels of strategy, addressed: (1) product lines and market areas, (2) acquisition activity, and (3) collective efforts through interorganizational linkages and lobbying. Choosing such a wide range of strategies was consistent with our intent to expand the notion of strategic groups beyond the level of business strategy. Choices of actual measures reflected both this concern and a concern for industry relevance—we used only measures that top managers in the financial services community viewed as meaningful.³ A pretest of the survey instrument with a group of senior managers ensured interpretability.

The first strategy measure—generalism—refers to the extent to which firms are expanding into a full range of financial services with in-house expertise in all areas. This measure of strategy is particularly relevant in the financial services community, given the incremental breakdown of the Glass-Steagall Act. The measure is also consistent with Porter's (1980) strategic target dimension which differentiates firms emphasizing a segment of an industry from those embracing an entire industry, and forms the basis of focus strategies of business units. We used a continuum ranging from specialism to generalism to describe this dimension. Low scores indicated pursuit of specialization; high scores, pursuit of generalism.⁴

The second strategy measure—internal expansion—refers not to the sizes of product lines, but to the market areas served (Hofer & Schendel, 1978). It captures the extent to which firms seek to increase their client bases through

² This study treated the measurement of opportunities and threats as a single continuum, which seems consistent with Andrews' (1971) use of the concept. An interesting replication, however, might involve treating threats and opportunities as separate continua (cf. Dutton & Jackson, 1987).

³ Stressing dimensions of strategy familiar to respondents in this industry has both advantages and disadvantages. Avoiding abstract general questions about strategy most likely enhanced the quality and accuracy of responses. On the other hand, the procedure raises the issue of generalizability.

⁴ As one reviewer pointed out, generalism could potentially be either a business-level or corporate-level strategy measure in the financial services industry, particularly since the vast majority of these firms can be viewed as dominant single business firms (Rumelt, 1974). Dess and Davis (1984) used this distinction in explaining their reliance on surveys of top management for information on business strategy issues. We, however, did not make Dess and Davis's assumption that business strategy is therefore synonymous with corporate strategy for such firms. Instead, we proposed finer distinctions in organizational strategies, using the six other dimensions of strategy described in this section.

domestic and international efforts. This measure also has particular relevance for the financial services community, in light of the fading McFadden Act restrictions against interstate banking. The third measure of strategy—external expansion—reflects the degree to which responding firms are pursuing strategic mergers or acquisitions of other financial institutions. This standard measure of corporate strategy is quite relevant to the industry studied here, with the business press currently reporting much merger and acquisition activity among financial service firms.

The fourth, fifth, and sixth measures of strategy are interorganizational and refer to the number of links—ranging from informal agreements to formal contracts, committee teams, and joint ventures—each firm had with (1) commercial banks, (2) thrift institutions, and (3) other financial service firms. In depicting firms as nodes in an interorganizational network, these interfirm linkages describe an aspect of collective strategy (Astley & Fombrun, 1983). Finally, the seventh measure of strategy—collective influence—is a summary scale measuring the extent to which firms engaged in organizational lobbying and attempted to influence government regulators and politicians.

The pretest, in which we asked industry members to interpret the meaning of specific questions, ensured high face validity of single-item measures. Following Kerlinger (1973: 454), we then maximized both reliability and construct validity by formulating detailed and highly specific items. As Huber and Power noted, “unstructured questions are more likely than are structured questions to be misinterpreted” (1985: 177). Confidentiality and anonymity of individual respondents were ensured, thereby removing a further disincentive to providing accurate information (Huber & Power, 1985).

To provide additional validation of the measures, an *ex post* analysis of archival data was performed on a randomly selected 10 percent of the responding firms. We rank ordered firms on the basis of responses to the measures of internal and external expansion, choosing these variables because their visibility in the business community increased the likelihood of finding the archival data necessary to test corroboration.

Using *Predicasts F & S Index* (Predicasts, Inc. 1983), we did an independent content analysis of accounts in the business press that concerned activities of firms in the subset during the year immediately following distribution of the questionnaire. Firms were then rank ordered in terms of the degree to which reports indicated they had engaged in the activities reported in their questionnaire. We obtained Spearman rank-order correlations of .83 and .74 for the rankings on the measures of internal and external expansion, which suggested that the responses to the questionnaire were reasonably valid measures of strategic activity.

To validate further the questionnaire's measure of generalism, a content analysis of annual reports for selected firms was conducted. We contrasted six firms, three with high scores and three with low scores. Their annual

reports yielded parallels of these extreme scores, as the following examples indicate:

As a leading financial services organization, we want to provide a full array of financial services to meet our clients' financial service needs (high generalism).

We have continued to broaden our line of products as we have seen new needs and opportunities arise in the marketplace (high generalism).

The [company's] strategy has been one of selectivity, pursuing the most promising prospects in each of these categories and improving the quality of its relationships with premium customers (low generalism).

The six firms fell into the same two groups identified through their questionnaire scores, offering support for the validity of the measure of generalism.

Analysis

A variety of multivariate analyses were used to explore the research questions. We first estimated regression models for each of the dependent strategy variables, using one independent variable for size, three independent variables for function, and three for environmental posture.⁵ This procedure allowed assessment of the structural and perceptual variables' relative importance in explaining strategic activity for each dimension of strategy, responding to the first research question. The same set of regression models also indicated which individual predictor variables were significant across dimensions of strategy, addressing the second research question. Finally, to address the third research question, we used cluster analysis (Hambrick, 1983; Harrigan, 1985) to derive supragroupings of firms—rather than variables—representing unique configurations across the dimensions of strategy.

RESULTS

Seven separate regression analyses on the dimensions of strategy explored the strength and direction of the influences of size, function, and environmental posture. The discussion of the regression models will proceed from product-market strategies to strategies for acquisition, interorganizational linkages, and collective influence. Table 3 presents the results of the regressions.

Research Question 1: Predictors of Group Membership

Several variables significantly explained the extent to which financial service firms pursue a strategy of generalism. The variable that explained the

⁵ The trichotomization of the institutional function variable—the use of three dummy variables rather than two dummy variables and an intercept term—presents no problems. As Maddala noted, "If we do not introduce a constant term in the regression equation, we can define a dummy for each group" (1977: 34). The typical procedure of dropping one of the dummy variables is simply "more convenient," according to Judge, Hill, Griffiths, Luetkepohl, and Lee (1982: 484).

TABLE 3
Results of Regressions for Different Dimensions of Strategy^a

Dependent Variables	Independent Variables							R ²	F ^d
	Functions			Postures ^c					
	Size ^b	Banks	Thriffs	Financial Services	Technical	Political	Competitive		
Generalism	.23*	-.29	.39**	-.22	.30**	-.16	.08	.23	4.0
Internal expansion	.23*	.56**	.09	-.88**	-.05	.06	.12	.40	8.7 ^e
External expansion	.37**	.05	.38*	-.75**	-.05	-.17	.14	.20	3.2
Links with banks	-.05	.82**	-.26	-.58**	.13	-.09	.20*	.33	6.4
Links with thriffs	-.09	-.27	.48**	-.56**	.00	-.05	.05	.29	5.3
Links with financial service firms	-.02	.10	-.41**	.14	.00	.08	.11	.15	2.3
Collective influence	-.19	-.07	-.04	.17	.19	-.13	.10	.10	1.5 ^e

^aCoefficients are standardized.

^bValues are logarithmic transformations.

^cNegative values on posture variables indicate perception of threat; positive values indicate perception of opportunity.

^dAll F-values > 2.0 are significant at $p < .01$; $df = 7, 93$ unless otherwise indicated.

^e $df = 7, 91$

* $p < .05$

** $p < .01$

*** $p < .001$

most variance was posture vis-à-vis technological environment. Firms viewing the technological environment as providing opportunities tend to offer a wider range of services than others. Institutional function was also significant, indicating that thrift associations are more likely to expand their product offerings. Finally, size was also significant, suggesting that relatively large firms tend to pursue strategies of greater generalism in product scope.

Groupings for the two measures of expansion seem to be principally related to size and institutional function. Size is a major predictor of both internal and external expansion, with relatively large firms more active along both dimensions. The importance of institutional function in explaining differences between firms pursuing internal expansion specifically indicates that financial service firms' strategies differ sharply from those of banks. The less-regulated financial service firms seem to place less emphasis on both internal and external expansion. In addition, the results for external expansion suggest that thrifts are particularly likely to stress growth through mergers and acquisitions. Commercial banks, on the other hand, appear more likely to emphasize internal expansion into new markets.

For the collective strategy dimensions, function was the best predictor of kinds of linkages. Banks formed linkages with other banks, thrifts with other thrifts, financial service firms eschewed links with thrifts, and vice versa. Posture was significant in explaining commercial banks' linkages, suggesting that firms viewing a competitive environment as offering opportunity tend to form networks with commercial banks more than with other institutions.

The results for collective influence alone were not significant. Size is the only variable approaching significance ($p = .10$), with relatively small firms engaging in more efforts to influence external actors than large firms do.

Research Question 2: Structural vs. Perceptual Predictors

Examining the strength of the individual relationships between the independent variables and dimensions of strategy across the equations should disclose if size, institutional function, and environmental posture emerge as consistently significant grouping criteria over the range of business, corporate, and collective strategies. The results, shown in Table 3, suggest that each of the three grouping criteria is a significant predictor in one or more of the equations.⁶

For example, environmental posture was a strong predictor of product scope strategy, with activity for this dimension of strategy related to top managers' perceptions of the technological environment. Interorganizational links with banks were also related to posture toward competitive environ-

⁶ To ensure that this discussion of the consistency of significant variables across equations would be meaningful, we performed a Chow test (Beatty & Zajac, 1987; Hambrick & Lei, 1985) to verify that the seven equations indeed differed. Twenty of the 21 pairwise comparisons showed statistically significant differences at the .05 level, suggesting that the regression coefficients between equations are indeed different from one another.

ments. In contrast, no posture variables significantly explained variance in the equations for internal or external expansion and collective influence.

Size emerged as an important constraint to both internal and external expansion strategies. It was also a significant predictor of generalism and appeared weakly significant in predicting collective influence efforts. However, size was not a significant predictor in any of the interorganizational linkage equations.

Institutional function emerged as the strongest, consistently significant predictor of a variety of strategic dimensions. It was significant in all equations except the one for collective influence and was particularly strong in predicting interorganizational linkages and internal and external expansion.

Research Question 3: Configurations of Strategies

To investigate the possible existence of sets of firms pursuing common business, corporate, and collective strategies, we grouped firms jointly on the seven dimensions of strategy, using Ward's minimum variance method of cluster analysis. Results suggest that specific groupings by individual dimensions of strategy are not the only possibility—the financial services industry as a whole can also be interpreted as consisting of three principal groups of firms pursuing similar sets of strategies across the seven dimensions. Table 4 describes these supragroupings in terms of cluster means on the seven strategy variables; presents information on firms' sizes, functions, and environmental postures; and provides results of Scheffé tests to designate statisti-

TABLE 4
Comparison of Multilevel Strategic Groups^a

Variables	Means ^b			Scheffé Comparisons of Means ^c			df
	Cluster 1	Cluster 2	Cluster 3	1-2	1-3	2-3	
Generalism	3.00	3.16	1.66	n.s.	*	*	109
Internal expansion	2.76	2.22	2.49	n.s.	n.s.	n.s.	106
External expansion	3.38	3.89	2.30	n.s.	n.s.	*	110
Links with banks	3.15	1.00	1.40	*	*	n.s.	110
Links with thrifts	2.00	3.32	0.60	*	*	*	110
Links with financial/service firms	4.46	0.35	0.78	*	*	n.s.	110
Collective influence	3.53	4.05	3.42	n.s.	n.s.	*	105
Size	2.39	1.73	2.30	n.s.	n.s.	*	110
Environmental posture (technical)	5.31	5.59	4.98	n.s.	n.s.	n.s.	105
Environmental posture (political)	3.73	3.00	4.19	n.s.	n.s.	*	99
Environmental posture (competitive)	3.00	2.49	2.98	n.s.	n.s.	*	106
Number of banks	6	4	29				
Number of thrifts	2	32	11				
Number of financial/service firms	5	1	23				

^a We derived the three-cluster solution using Ward's minimum variance method and chose it because of an inflection point in the cubic clustering criterion at $n = 3$.

^b Cluster 1, $n = 13$; cluster 2, $n = 37$; cluster 3, $n = 63$.

^c n.s. = not statistically significant.

* $p < .05$

cally significant differences in pairs of cluster means. Discussion will generally cover those clusters with means that are significantly different from others.

Cluster 1 includes firms distinguishing themselves sharply from others in their pursuit of interorganizational linkages, particularly with commercial banks and financial service firms. The cluster is small, with only 13 members, most of which are commercial banks and financial service firms.

Cluster 2 consists primarily of thrift institutions, which represent 32 of its 37 firms. These firms report the lowest average number of linkages with either banks or financial service firms, but maintain linkages with other thrifts. At the same time, firms in this supragroup indicated the highest tendency towards growth through mergers and acquisitions and were also the most active in collective influence efforts. The differences between the two clusters' mean scores on these two dimensions were not, however, statistically significant across the board. Not surprisingly, the firms in cluster 2 view their political and competitive environments as more threatening than other firms do. These firms were on the average smaller than those in other clusters.

Finally, cluster 3 represents a mix of institutions and has a general strategic profile contrasting dramatically with the other two clusters'. Noteworthy features of typical cluster 3 firms are strong emphasis on specialization of product line and strong reluctance to grow through merger or acquisition. Although this cluster resembles the first in several respects, including size and composition by types of institutions, the two are very different: cluster 3 has a much lower average number of linkages across the network of banks, thrifts, and financial service firms, and it is the largest ($n = 63$) of the three groups.

DISCUSSION

This study attempted (1) to complement the traditional analysis of stratification by including both environmental perceptions and structural variables as predictors of the composition of strategic groups, and (2) to extend discussions of stratification beyond the business-strategy level to include corporate and collective strategic activities. We now address both industry-specific findings and implications for future research on strategic groups.

The findings reported here suggest that firms viewing the technological environment as providing opportunity saw technological advancements as vehicles for broadening the scope of their firms' products. These results fit popular press accounts of the large investments that banks and financial service firms have made in electronic funds transfer systems—a set of technological innovations that the more traditional thrift institutions have been slow to adopt. Perhaps changes in the technological environment allow firms in the financial services industry to increase the range of their product and service offerings without any severe change in their organizational and financial structures. These results suggest the usefulness of including perceptual measures in understanding intraindustry stratification.

With respect to internal and external expansion, two findings appear noteworthy. The statistical significance of the size variable suggests that market expansion—either internal or external—requires considerable corporate resources of a sort available only to larger institutions. The statistical significance of institutional function indicates that commercial banks may use their resources more for internal expansion, but thrifts are more likely to engage in mergers and acquisitions. These might represent a defensive corporate strategy, an issue often mentioned in accounts of mergers between banks and thrift institutions that the latter initiated to avoid being acquired (Business Week, 1984a). Also, there was a noteworthy lack of expansion activity among financial service firms. Perhaps the well-publicized failures of such firms' attempts to expand into new areas have influenced strategic activity at this level (Business Week, 1984b).

With respect to collective strategies, the extent to which interorganizational linkages remained largely within institutional functions is of interest. Many interfunctional linkages might seem likely, given the popularity of the opinion that institutional definition is becoming increasingly irrelevant. Although regulatory barriers may be crumbling, results suggested that firms in the financial service industry remain strongly connected to their own types and that institutional identity remains an important source of intraindustry stratification. In addition, the weak finding regarding collective influence strategies suggests that small institutions favor lobbying and public relations, although caution must be exercised in interpreting this result.

In general, examining these shifting combinations of significant grouping criteria for a broad range of dimensions of strategy suggests that neither structural nor perceptual variables alone sufficiently explain intraindustry stratification. This study showed that standard mobility barriers like size and institutional function are not the only predictors of industry stratification. Thus, a search for a single, exclusive group structure, traditionally derived from *ex post* measures of strategy, may oversimplify industry stratification. Indeed, these results may shed some light on Dess and Davis's finding that "an apparent lack of singularity in strategic orientation . . . characterizes the highest performing group" (1984: 484). This lack of singularity may well reflect a mix of business, corporate, and collective strategies that an analysis of strategy restricted to one level does not capture.

This study suggested how the concept of strategic groups can fruitfully extend to strategic supragroupings, encompassing combinations of business, corporate, and collective strategies. The configurations of Table 4 suggest an industry profile with three supragroups: (1) a small group of large commercial banks and financial service firms that emphasized a strategy of many links with other firms in the industry; (2) a larger group—similar to the firms just described in terms of size and function—that opts instead for an internally oriented strategy emphasizing product specialization and self-sufficiency; and (3) a third group—composed mostly of thrifts, small firms, and firms which view the competitive environment as threatening—that emphasizes merger activity and strategies for collective influence like lobbying and

public relations. Attention to these multilevel similarities and differences in strategic activity may improve understanding of intraindustry dynamics.

Limitations and Implications for Future Research

This study's exploratory nature and narrow focus on only the largest firms in the financial services industry necessarily limit its conclusions. The relevant combination of perceptual and structural predictor variables might differ for smaller firms. Also, a larger set of predictor variables would allow future researchers to address the full range of perceptual and structural variables that combine to explain intraindustry stratification.

In addition, questionnaires have inherent weaknesses—for example, it may be problematic to have a single respondent per firm provide data on variables whose relationships are then examined. Although the forms of external validation that we employed are useful, other avenues—such as surveying multiple respondents or gaining closer access to top managers' perceptions via interviews or observation—would also be fruitful. We also assumed, following Andrews (1971), that environmental perceptions influence strategic choices. However, these cross-sectional data do not allow us to rule out possible reverse causality. Cross-sectional data also make it impossible to test for the findings' robustness under different environmental conditions; the findings reported here may differ from those that data from different eras in the financial services industry would yield. Moreover, this study purposely focused on a single industry; future research should balance the advantage of avoiding confounding from industry differences with the potential loss of generalizability.

Future research might also contrast the relative dominance of different levels of strategy. Do groups of firms emphasize one level of strategy and deemphasize others? The interplay between collective and business-level strategies might be particularly interesting to examine.

In addition, future studies could extend the concept of environmental posture to include not only general perceptions, but very specific descriptions of the expected activities of particular competitors. Using more fully articulated measures of posture could further develop important linkages between strategic management and game theory, a body of work that emphasizes the impact of perceptions on competitive dynamics.

Finally, future work should explore variation in profitability as a function of strategic group membership across levels of strategy. Are particular configurations of business, corporate, and collective strategies associated with high profitability (Hambrick, 1983; Miller & Friesen, 1980)? Research on the performance implications of strategic groups can benefit from broadening its perspective to include strategic intent and multilevel group membership.

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APPENDIX

Measures

Environmental posture. Items measured perceptions of technological, political, and competitive environments on a 7-point scale, with 1 = great threat and 7 = great opportunity, in response to: To what extent does your organization consider each of the following forces as an opportunity or threat to its operations?

The development of Electronic Funds Transfer Systems, including automatic teller machines, electronic money, automatic payment, and point of sale systems.

The provisions of the Depository Institutions Deregulation and Monetary Control Act of 1980.

The increased competition for deposits between banks and such nonbank financial intermediaries such as Merrill Lynch, Prudential-Bache, or Sears, Roebuck.

Strategy. The questionnaire measured the following dimensions of strategy on a 6-point scale ranging from 0 = not at all to 5 = a great deal for responses to: To what extent is your organization currently engaged in the following activities?

Generalism—expanding into a full range of financial services with in-house expertise in all areas (1 item).

Internal expansion—looking to increase client base through interstate arrangements or international activity (2 items).

External expansion—engaging in strategic mergers or acquisitions of other financial institutions to capitalize on environmental opportunities and/or threats (1 item).

Collective influence—general lobbying or public relations through a trade association or the mass media (editorials and position papers) (2 items).

Links with banks, thrifts, and financial services were measured by asking respondents to check the boxes indicating the firms with which they were related through joint activity. Boxes resulted from the matrix of firms and activities. Firms included commercial banks; thrift associations, savings and loan associations and mutual savings banks; and other financial service firms, including life insurance firms, brokerage houses, investment banks, and general financial service firms. Activities included informal agreements, formal contracts, committee teams, and joint ventures.

Size was measured by: In what asset range would you place your organization at the present time? \$1-3 billion, \$3-5 billion, \$5-20 billion, or greater than \$20 billion.

Function was measured by: Listed below are a range of financial institutions. Please circle the principle institution you are a member of: commercial bank, mutual savings bank, savings and loan association, financial services company (such as Merrill Lynch or American Express), life insurance company, or brokerage house/investment bank.

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MANAGERIAL CONTROL, PERFORMANCE, AND EXECUTIVE COMPENSATION

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Using a sample of 71 very large manufacturers, this study demonstrated that executives in externally controlled firms receive more compensation for performance and less for scale of operation than their counterparts in firms without dominant stockholders. This finding held true for both compensation level and its rate of change over time. Our main conclusion is that outside dominant stockholders view firms primarily as investments and have the power and the incentive to align the compensation of hired CEOs with performance of firms.

Both a popular and an academic literature point out that the pay of chief executive officers (CEOs) is not systematically related to the performance of firms (Deckop, 1987; Lawler, 1971; Redling, 1981; Rich & Larson, 1984; Roberts, 1959). Although profitability does show up as an important predictor of CEOs' compensation in some studies (Agarwal, 1981; Lewellen & Huntsman, 1970), a long stream of research has shown that a company's size is the main predictor of executives' pay (e.g., Baumol, 1959; Dyl, 1985; Fox, 1980; McGuire, Chiu, & Elbing, 1962; Rich & Larson, 1984). The findings reported in most of this research also show that, with size controlled, the performance of firms has little or no bearing on executives' compensation. This study addressed the differential effects of company size and performance on executives' compensation in owner-controlled and management-controlled firms. Its central argument is that CEOs' pay is more responsive to performance in owner-controlled firms with dominant stockholders.

COMPANY SIZE AND EXECUTIVE COMPENSATION

The correlation between a firm's size and a CEO's pay level is not surprising and has several logical explanations. Simon (1957) argued that organizations attempt to maintain appropriate salary differentials between management levels and establish these pay differentials not in absolute terms, but as ratios. Consequently, the compensation of chief executive officers should be greater in large firms because they tend to have more executive levels. In this vein, Mahoney (1979) studied pay differentials between executive grades and concluded that a difference between two levels is normally equivalent to a 30 to 40 percent difference in compensation. Thus, many organizational levels implies high pay at the top. The assumption that large firms will have

more executive levels than small firms is not an unfounded assumption; it is consistent both with span-of-control theory and with the findings of Blau (1970) and Child (1973) that firm size and number of levels are highly correlated.

Economic theory also suggests that executive pay and company size should be related (Roberts, 1959). An executive's marginal revenue product is the excess of a firm's total profit under that person's direction over what it would be under the direction of the best alternative executive, plus the amount that would have to be paid to secure the latter's services. This total amount represents the upper limit the firm would be willing to pay the executive. The lower limit of the executive's compensation would be the sum that this individual could command in the next best employment opportunity. Assuming (1) perfect information and mobility, and (2) continua of alternative jobs open to executives and executives available to firms, the upper and lower limits will converge, and executives will receive compensation equal to their *marginal revenue products*. Without these assumptions, the limits would not converge, and the executives' compensation levels would be indeterminate between them. In the second, more realistic, case, the range of indeterminacy can be quite wide. Because a small firm sells relatively few units, even a substantial difference in efficiency—as reflected in profit per unit—that one executive achieves and another might not cannot yield a large difference in total profit. In a large firm, however, the large number of units sold can convert even a modest marginal difference in profit per unit into a dramatic increase in total profit. By the same token, a firm's ability to pay a CEO should be greater in large firms because CEOs' compensation levels relative to total revenues tend to be inversely related to company size.

The other component of compensation, the price of the best alternative executive, should also be related to firm size. Large firms are likely to fill vacancies by hiring replacement CEOs from other large firms. If there is a shortage of executive talent, firms must pay competitively in order to attract and retain executives (Roberts, 1959). In Dunlop's terminology, firms of various sizes face their own unique "wage contours" (1975: 127) in the managerial and executive markets.

A closely related economic argument is based on human capital theory (Agarwal, 1981; Becker, 1964). To the extent that a company's size is associated with job complexity for its top executive, a close relationship should exist between organizational size and CEO's compensation. Job complexity refers to the nature and magnitude of responsibility vested in a job; it is a structural concept relating to what a job is, rather than how well it is performed. As organizational structures become larger and more complex, and CEOs' work specifications get tougher, their pay should also increase to compensate them for the additional human capital requirements their jobs demand.

The above explanations for the relationships between firm size and CEOs' pay do not imply, though, that increases in size, efficiency, and profitability

go hand in hand (Roberts, 1959). Neither do they mean that maximizing a firm's size leads to maximizing its stock price (Brigham, 1985). The range of indeterminacy in CEOs' pay may be quite wide, even for firms of similar sizes (Roberts, 1959). Among the largest firms, even small improvements in efficiency may yield larger increases in total company profits than the firms would obtain through further increases in size (McEachern, 1975). Therefore, company size should not be more important than performance as a determinant of CEOs' pay for the largest firms (McEachern, 1975).

Empirical evidence for these explanations in terms of human capital and the external labor market is rather limited and somewhat mixed. This probably reflects the difficulties involved in operationally defining some of these concepts. Agarwal (1981), using a sample of insurance firm CEOs, tested for close relationships between CEOs' job complexity, measured as firm size; the executives' human capital, measured by previous work experience, educational level, and type of degree; and level of compensation. Although firm size and CEOs' compensation were highly related ($r = .78$), the human capital variables accounted for very little variance in CEOs' pay. Likewise, Dyl (1985) examined the relationship between several demographic characteristics of CEOs normally used as proxies for human capital and CEOs' pay among a sample of 271 *Fortune* 500 firms; he concluded that "none of these demographic variables were statistically related to the level of compensation" (1985: 5). McCann and Hinkin (1984), who analyzed 812 executive transitions during 1980 through 1983, found that most executive replacements came from similar firms within the same industries as the hiring firms. This suggests that the executive labor market is rather segmented and that a going market rate for executives may very well exist within each segment.

Performance, Managerial Control, and Executive Compensation

What is most intriguing in the literature investigating executive compensation is that, *after controlling for size*, researchers have not found the relationship between CEOs' pay and company performance to be as strong or consistent as the classic economic and behavioral theories would imply. After all, a fundamental premise of a market system is that the best performers should receive the highest rewards. Yet practicing compensation specialists point out that "there is little evidence of a direct pay-for-performance relationship between top executives' compensation and corporate performance" (Redling, 1981: 15) and that companies with long-term incentives for chief executives were giving "stockholders an annual return no better than the return in companies without such incentives" (Rich & Larson, 1984: 20).

There is a line of theoretical reasoning that provides some basis for reconciling these divergent findings. Perhaps it is not reasonable to assume that managers seek to maximize profits in the sense of classic economics. In the conventional profit-maximizing model, a manager acts as a surrogate for an owner and—since it is the owner's goal to maximize profits—the manager's behavior reflects this. Lacking equity interests in their firms and thus insu-

lated from "both product-market and stockholder constraints" (McEachern, 1975: 41), managers' motivations might differ, and their actions might be likely to deviate from profit-maximization behaviors. Insulation from the ownership side can occur quite easily when shareholdings are spread across such a large number of stockholders that the owners' power to affect a firm is diluted. Berle and Means (1968), Galbraith (1976), and others have advanced this thesis.

This stream of research has implications for economic theory and policy because it examines a fundamental premise of classic economic theory, that the management of a firm does and should reflect the interests of its owners. If we assume a difference between the interests of owners and management, it follows logically that with great separation of control, the making of policies and decisions will not adequately reflect the interests of the owners. An important early study by Berle (1959) concluded that shareholders controlled only 34 percent of the 200 largest nonfinancial corporations. Lerner (1970) reported that this figure had dropped to 12 percent. Such a finding strikes at a core idea of classic economics because owners, interested in profitability, may lose control of their assets to managers who may have different intentions.

A number of empirical studies have examined whether or not type of control makes any difference in the behavior of firms, and some systematic differences between owner- and management-controlled firms has emerged. Owner-controlled firms tend to have higher profitability (McEachern, 1975), and they replace executives more frequently when performance declines (Salancik & Pfeffer, 1980). Management-controlled firms tend to over-report earnings (Saloman & Smith, 1979), are more risk-averse (Palmer, 1973), and are more likely to engage in activities that may violate antitrust laws (Blair & Kaserman, 1983).

If these differences exist between management- and owner-controlled firms, it follows that type of control could be a key determinant of the pay levels of chief executives. Managers setting their pay levels relatively free of the influence of owners are, as Baumol (1959) noted, more likely to place their interests above those of the owners, who impose little penalty. Managers will seek to maximize sales and use this, rather than performance, as a basis for pay for three reasons: (1) As we discussed, large size may be used to justify high pay. (2) Executives may have a double standard about how pay levels should be determined. Dyer, Schwab, and Theriault (1976) found that managers believe that performance should be the basis of their subordinates' pay and that seniority, cost of living, education, and the like should not be major determinants of pay increases. They have different criteria for themselves, however, believing that their pay should be performance-based, but that cost of living, seniority, and the like should also be important considerations. Therefore, it should not be surprising that when executives control a firm, performance is not likely to be the basis of their pay, and other factors will weigh heavily in the calculation. But, if owners' orientations to the pay of those they hire—the managers—resemble managers' orientations toward their subordinates' pay, owner-controlled firms should base execu-

tives' pay more heavily on performance than will management-controlled firms. (3) Size is a less risky basis for setting executives' pay than performance, which is subject to many uncontrollable forces outside the managerial sphere of influence.

Hypotheses

Previous research on the relationship between compensation to CEOs and factors like size and performance has produced weak relationships with company performance. Research focusing on distribution of ownership, however, provides a potentially useful theoretical point of departure. Drawing on it, we framed hypotheses concerning the effects of type of control on executive pay that specify correlates of the components of pay structures, the level of pay of each component, and changes in each component of pay.

It follows from our arguments that owner-controlled firms will reward executives for the outcomes that owners prefer; thus, performance will most affect CEOs' pay. Likewise, CEOs in management-controlled firms will prefer to avoid the risk of tying pay to performance; therefore, firm size, which is likely to vary less than performance, will most affect pay (McEachern, 1975).

Hypothesis 1: Performance, rather than scale, will be the most important determinant of compensation level for all components of executive pay in owner-controlled firms.

Hypothesis 2: Performance, rather than scale, will be the most important predictor of changes in all components of executive compensation in owner-controlled firms.

Hypothesis 3: Scale, rather than performance, will be the most important determinant of compensation level for all components of executive compensation in manager-controlled firms.

Hypothesis 4: Scale, rather than performance, will be the most important predictor of changes in all components of executive compensation in manager-controlled firms.

A fifth hypothesis concerns the mix of elements in compensation structures. Again, we assume that CEOs will act in their own best interests, and owners will act in theirs. All else being equal, owner-controlled firms should make a larger share of compensation contingent on performance than will management-controlled firms. Theoretically, bonuses and long-term incentives are more contingent on performance than is base salary. Therefore, owner-controlled firms are more likely to develop pay packages for CEOs favoring bonuses and long-term income rather than base salary. On the other hand, executives in management-controlled firms would prefer just the opposite type of compensation structure in order to minimize personal risks. By implication, we expected to find a higher correlation between performance and bonuses and long-term income as proportions of total income in owner-controlled firms.

Hypothesis 5a: Bonuses and long-term income will be greater proportions of total CEO compensation in owner-controlled firms than in management-controlled firms.

Hypothesis 5b: Bonuses and long-term income as proportions of total CEO compensation will be more highly related to performance in owner-controlled firms than in management-controlled firms.

METHODS

Sample

In its annual survey of executive compensation for the years 1979 through 1982, *Business Week* (1980-83) published a list of 71 companies that an executive firm randomly selected from the 400 manufacturing firms listed in Standard & Poor's COMPUSTAT® tapes as largest in terms of sales. This list of companies, which appears in Table 1, provided our sample. All 71 corporations are classified as manufacturers¹ on the basis of corresponding three-digit Standard Industrial Classification codes. We gathered statistical data for each firm, including CEOs and their compensation, from *Standard & Poor's Directory*, *Business Week*, and corporate annual reports, for 1979 through 1982. A four-year period is long enough to limit the influence of short-term irregularities, but short enough that management's philosophy and structure can be thought of as continuous (McEachern, 1975). Of the 71 organizations studied, 68 percent had annual sales exceeding \$1 billion dollars.

Measures

Ownership. Although the precise functional relationship between concentration of ownership and control is unknown, research spanning more than 50 years suggests that the proportion of stock required to exercise significant control in large firms may be quite small. A study conducted by the Securities and Exchange Commission in 1937 argued that 10 percent stock ownership was sufficient to allow exercise of substantial influence over a firm. By the early 1960s, researchers were applying a lower cutoff point—5 percent stock ownership—to distinguish between owner- and management-controlled firms. They argued that as firms grew and stocks became more widely distributed, the fraction needed to exercise control would shrink. Using this 5 percent ownership convention, researchers have demonstrated significant differences between owner- and management-controlled firms on

¹ Previous surveys have shown minor differences in CEOs' pay for firms of similar size within manufacturing subsectors—durable compared to nondurable, for example—but these are not of great magnitude, as would be the case for comparisons of CEOs' pay across diverse industries like banking, manufacturing, and agriculture (Smart, 1985). We found no significant differences in executives' compensation by product line in the sample of firms used in this study.

TABLE 1
Firms in Sample^a

American Can Company	International Harvester Company
American Home Products Corporation	International Paper Company
American International Group, Inc.	Johnson Controls, Inc.
American Motors Corporation	Kimberly-Clark Corporation
Armco Inc.	Eli Lilly & Company
Atlantic Richfield Company (ARCO)	The Mead Corporation
Baker International Corporation	Merck & Company, Inc.
Boeing Company	Mobil Corporation
Burroughs Corporation	Monsanto Company
Caterpillar Tractor Company	NCR Corporation
Clark Equipment Company	NL Industries, Inc.
Colgate-Palmolive Company	National Can Corporation
Cone Mills Corporation	National Distillers & Chemical Corporation
Continental Group, Inc.	Philip Morris Company, Inc.
Control Data Corporation	Phillips Petroleum Company
Cooper Industries, Inc.	Procter & Gamble Company
Dana Corporation	R. J. Reynolds Industries
Dresser Industries, Inc.	Schering-Plough Corporation
Exxon Corporation	Shell Oil Company
Faberge, Inc.	SmithKline Beckman Corporation
Firestone Tire & Rubber Company	Standard Oil Company of California
Ford Motor Company	Standard Oil Company of Indiana
General Dynamics Corporation	Standard Oil Company of Ohio
General Motors Corporation	Stauffer Chemical
General Signal Manufacturing Corporation	J. P. Stevens & Company, Inc.
Gillette Company	St. Regis Paper Company
The B. F. Goodrich Company	Teledyne, Inc.
The Goodyear Tire & Rubber Company	Texaco, Inc.
Gulf Oil Corporation	Union Oil of California
Harris Corporation	Uniroyal, Inc.
Hoover Company	United States Steel Corporation
Hughes Tool Company	Warner-Lambert Company
ITT Corporation	Westinghouse Electric Corporation
International Business Machines Corporation	Wheeling-Pittsburgh Steel Corporation
Ingersoll-Rand Company	Whirlpool Corporation
Inland Steel Company	

^a N = 71.

a variety of measures, including rates of return on investment (Boudreaux, 1973), risk aversion (Palmer, 1973), performance (Glassman & Rhoades, 1980; McEachern, 1975; Sorenson, 1971, 1974), executive transitions (Salancik & Pfeffer, 1980), and antitrust activities (Blair & Kaserman, 1983; Chevalier, 1969).

In this study, we designated a firm as owner-controlled if at least 5 percent of its outstanding stock was in the hands of one individual or organization that was not involved in actual management of the company. A firm was management-controlled when no individual or organization controlled 5 percent or more of its stock. We used a dummy variable, with owner-

controlled firms coded as 1 and management-controlled firms coded as 0; 19 firms were owner-controlled, and 52 were management-controlled. No firm in the sample was owner-managed, with a dominant stockholder who was also the CEO.

Performance and scale indicators. A firm's performance was defined as a composite of its financial success and the extent to which it maximized the welfare of its stockholders. The use of profitability can be criticized: it may not reflect a firm's true underlying value or performance because executives can manipulate indicators to make themselves look good. Depreciation policies, accelerated versus straightline; inventory procedures, FIFO versus LIFO;² use of short-term, noncapitalized leases to obtain productive equipment; and window dressing techniques, such as holding borrowed money as cash until the end of the year so a balance sheet looks good, are all potential problems when interpreting accounting data.

Although some firmly believe that not profitability, but stockholders' welfare—in the form of increases in stock prices or dividends paid—should dictate executives' pay (Poster, 1985; Rappaport, 1978), others have questioned these measures as well. Paying out cash dividends will tend to raise a stock's price. However, raising cash dividends decreases funds available for reinvestment and R&D, which lowers expected growth rate and depresses the price of a stock in the long run—with effects perhaps occurring at a time when another executive will bear the brunt of the problem (Brigham, 1985). Stock prices are also very sensitive to external events that may have little to do with how efficiently a firm is run and that are totally beyond management's control (Deckop, 1987). Because of these concerns, compensation consultants such as Bickford (1981), Ellig (1984), and Rich and Larson (1984) have frowned on the use of stock price data as the primary basis for establishing CEOs' pay and have instead suggested use of profitability measures as proxies for performance, or use of a combination of stock price and profitability data.

Using multiple indices is more important than the specific measure of firm performance chosen because any single measure may arouse criticism (Weiner & Mahoney, 1981). Pooling performance data into a four- or five-year average also provides a better long-term indicator and a more reliable and valid measure of firm performance than annual measures (Brigham, 1985; McEachern, 1975). We calculated several average measures for each firm in the sample with the goal of developing reasonably independent parameters for scale and performance during the four years from 1979 through 1982. These measures include: (1) annual sales volume; (2) annual total profits; (3) annual percent change in sales; (4) annual percent change in reported profits; (5) annual return on equity (ROE); (6) annual earnings per share (EPS); (7) annual percent change in dividend yield to investors on a company's stock; (8) year-end market value of a firm; and (9) annual percent

² FIFO stands for "first in, first out"; LIFO stands for "last in, first out."

change in a firm's market value, computed by multiplying stock price times number of shares.

Sales volume and total profit reflect absolute dollar values in the scale of firms (Lewellen & Huntsman, 1970). Measures 3 and 4 indicate the magnitude of the rate of change for sales and profits for the period. The profitability ratios are the two "bottom-line" standardized financial indicators that firms most commonly use (Brigham, 1985; Woelfel, 1980). Measure 5, ROE, is based on net income relative to common equity, and measure 6, EPS, is based on net income relative to shares outstanding. The last three measures are indicators of stockholder's welfare (McEachern, 1975). Dividend yield reflects managers' decisions on allocating net income to common stockholders, as dividends per share, or to corporate savings, as retained earnings. Finally, the stock price measures indicate what investors think of a company's past performance and future prospects (Brigham, 1985).

These nine measures were factor-analyzed by the principal axis method with the squared multiple correlation as the estimate of communality. A plot of eigenvalues indicated that only two factors reached the standard criterion of 1.0. Table 2 shows the rotated varimax solution for all measures. Two distinct factors emerged: scale, composed of sales volume and total dollar profits, and performance, composed of the four-year rates of change in profits and sales, return on equity, earnings per share, stock price, dividend yield, and annual percent change in market value.

It is not surprising that the performance measures loaded on a single factor. Changes in levels of sales affect net income, the common denominator of the ROE and EPS ratios. A firm's ability to pay dividends depends on its earnings. In financial markets, investors and credit analysts use the information contained in annual reports to form expectations about future earnings, thereby affecting stock prices. Changes in stock prices tend to follow the

TABLE 2
Results of Principal-Axis Factor Analysis with Varimax Rotation:
Scale and Performance Indicators

Financial Items	Factor 1	Factor 2
	Scale	Performance
Dollar sales	.921	.005
Dollar profits	.927	.306
Percent change in sales	.048	.662
Percent change in profits	.007	.723
Percent change in dividends	.115	.652
Common market value	.118	.622
Return on equity	.035	.878
Earnings per share	.229	.767
Percent change in stock price \times shares	.063	.420
Eigenvalues	4.810	2.426
Percent of variance	59.7	40.3

announcement of EPS, ROE, and dividend actions, indicating that these reports have important signaling effects (Fama & Miller, 1984). If the profitability ratios are all good, a stock price will probably be as high as is possible (Brigham, 1985).

Because using each separate item as an independent variable would have created a severe multicollinearity problem, we instead used these two composites. We calculated each of the factor scores by adding the standardized value of each variable weighted by its factor loading and then standardized the composite factor scores. As Table 3 shows, the resulting two factor scores are not highly correlated ($r = .307$).

CEOs' compensation. Compensation has three distinct components: salary, bonuses, and long-term income. The last includes a wide array of deferred compensation benefits like pensions, profit sharing, stock options, IRAs, and bonus deferrals. Constructing three different compensation measures for each executive in the sample, we computed (1) the mean absolute dollar amounts received from 1979 through 1982 for salary, bonuses, and long-term income, (2) the mean annual percent change over the period for each of these components, and (3) the relative weight of each component in the earnings mix, calculated as an average ratio of the value of a particular component to total compensation received during this period.

External hires. Attracting an executive from another organization may have a separate effect on compensation level. We recorded CEOs who had been hired from outside their companies in this period as externals, with 0 = no outside hire and 1 = outside hire, and entered this information as a control variable in the regression equations. Table 3 presents the relationship between external hires and the other measures of the study. We did not consider executives who had been promoted from within during this period as a separate category since there were no significant differences between the earnings of this group and those of incumbents.

Analysis

Hypotheses 1–4 and 5b were tested by regression analysis. We calculated separate stepwise regression equations for the owner- and management-controlled groups, with scale, performance, and external hires entered as predictors and the three components of CEOs' compensation as dependent variables. Using the Chow test (Chow, 1960), we tested the statistical significance of the differences in the regression slopes between the two types of firms. In all the regression procedures, we entered scale into the equations first for two reasons. This factor has the highest bivariate correlation with the level of CEOs' earnings (Table 3). Moreover, entering scale first was the more conservative approach. This procedure gives the scale coefficients the maximum benefit of the doubt and underestimates the contribution of performance in terms of explained variance.

For Hypothesis 5a, we used a test of proportion (McNemar, 1967) to determine whether bonuses and long-term income were greater proportions of total compensation in owner-controlled firms than in management-controlled firms.

TABLE 3
Intercorrelation Matrix for Predictors and Compensation Measures^a

Variables ^b	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
1. Scale	0.00	1.00	—											
2. Performance	0.00	1.00	31	—										
3. External hires	0.28	0.06	-08	-18	—									
4. Salary	214.26	145.07	36	21	-12	—								
5. Bonuses	166.74	138.72	21	21	17	72	—							
6. Long-term income	171.12	82.40	29	32	-09	35	28	—						
7. Percent change in salary	27.83	16.31	11	20	-01	19	08	24	—					
8. Percent change in bonus	23.12	19.94	27	21	34	26	36	18	30	—				
9. Percent change in long-term income	10.71	6.23	08	22	-07	15	-07	23	15	-16	—			
10. Salary / total	0.43	0.15	-15	-11	-05	-01	-16	-08	31	-04	03	—		
11. Bonus / total	0.34	0.13	00	-22	10	04	-03	08	00	39	-03	08	—	
12. Long-term income / total	0.23	0.14	16	26	-09	22	30	-62	-13	04	-63	-69	07	—
13. Owner control	0.27	0.44	-19	-24	09	-19	-26	-03	-24	-16	-15	00	12	-11

^a Decimal points are deleted; $r > .05$; $r > .20$, significant at $p < .01$; $r > .28$, significant at $p < .001$.

^b The scale and performance measures are calculated in standardized scores; salary, bonuses, and long-term income are calculated in thousands of dollars.

RESULTS

Table 4 shows the separate regression results for the management- and owner-controlled firms. As the first three columns show, only performance reaches statistical significance as a predictor for each of the absolute compensation measures in the owner-controlled group. In the management-controlled firms, on the other hand, scale is the only predictor of base salary and the main predictor of bonuses and total compensation, although performance does have a major effect on long-term income.

Table 4 also shows that performance explains seven times the amount of variance in the percent change in total compensation for the owner-controlled group relative to the management-controlled group ($\Delta R^2 = .231$ versus $\Delta R^2 = .038$). The performance factor reached statistical significance at the .01 level only in the owner-controlled firms for percent changes in salary, bonuses, and long-term income.

For the measures of compensation mix, shown in the last three columns of Table 4, the owner- and management-controlled groups behaved similarly. Performance is negatively related to base salary and bonuses as percentages of total compensation and positively related to long-term income as a percentage of total compensation. However, a test of proportion showed that the differences between the owner- and management-controlled groups on the fractions of compensation devoted to salary (46.14% vs. 42.04%), bonuses (33.4% vs. 34.2%), and long-term income (20.5% vs. 23.7%) did not reach statistical significance, thereby failing to support Hypothesis 5a.

The Chow tests indicate that, with the exception of absolute long-term income ($p < .10$) and the compensation mix equations (n.s.), there are significant differences in the slopes of the regression equations between owner- and management-controlled firms, providing general support for Hypothesis 1-4 but not for Hypothesis 5b. Table 5 summarizes the regression results in terms of the hypothesized relationships, again illustrating support for all but the hypotheses concerning compensation mix.

DISCUSSION

A firm's type of ownership significantly affects its CEO's pay. When there are dominant stockholders, CEOs' compensation levels primarily reflect their firms' performance levels—these executives are paid more for performance and less for the scale of operation than CEOs in firms without dominant stockholders. We found this to be true for both pay level and its rate of change over time.

Compensation mix does not differ for the two types of firms, and long-term income, as a proportion of total compensation, appears to be closely associated with performance in both owner- and management-controlled firms. The U.S. tax system may promote this similarity. The value of any financial reward depends on the stream of income after taxes. When federal and state income taxes are included, the marginal tax rate for an executive in a large corporation could approach 70 percent during the period of this

TABLE 4
Determinants of Executive Compensation

Compensation Items and Predictors	Absolute Amounts					Yearly Percent Change					Percentage of Total Package				
	Management- controlled		Owner- controlled		Chow Test F-Value	Management- controlled		Owner- controlled		Chow Test F-Value	Management- controlled		Owner- controlled		Chow Test F-Value
	b	R ²	b	R ²		b	R ²	b	R ²		b	R ²	b	R ²	
Salary Scale	30.19***	.145	-4.71	.010	4.02**	2.52	.001	10.23	.054	2.97*	-.044	.025	-.045	.119	0.85
Organizational performance	17.70	.168	1.48**	.052		5.19	.056	6.75**	.118		-.040**	.186	-.018	.192	
External hires	-68.84	.172	-118.33	.054		11.05	.061	16.85	.122		-.163	.188	-.078	.203	
Bonuses					2.68*					4.13**					2.12
Scale	13.53***	.035	-10.37	.017		12.92***	.069	-7.45	.003		-.014	.030	-.055	.113	
Organizational performance	17.84*	.074	1.59*	.054		2.27	.079	5.78**	.200		-.027***	.113	-.107**	.214	
External hires	354.72***	.076	-57.68	.056		293.31***	.342	18.04	.215		.419***	.307	.106	.239	
Long-term income					2.44					3.63**					1.16
Scale	39.80*	.091	8.67	.017		1.41	.002	8.13	.060		.015	.052	.099*	.188	
Organizational performance	54.46**	.178	34.16*	.096		0.43	.002	14.75**	.245		.067***	.182	.026***	.262	
External hires	-179.78	.186	71.99	.097		-44.85	.002	65.35	.277		-.257	.203	-.027	.263	
Total compensation					3.01*					3.44**					N.A.
Scale	83.53***	.154	-6.41	.005		16.85*	.034	10.92	.034		N.A.	N.A.	N.A.	N.A.	
Organizational performance	90.00*	.229	31.08*	.058		7.89*	.072	27.29**	.265		N.A.	N.A.	N.A.	N.A.	
External hires	106.11	.230	-174.02	.067		259.52**	.155	100.24	.289		N.A.	N.A.	N.A.	N.A.	

* $p < .05$ ** $p < .01$ *** $p < .001$

TABLE 5
Summary Matrix Showing Significant Determinants
of Executive Compensation by Ownership Category

Compensation Items	Owner-controlled			Management-controlled		
	Absolute	Yearly Percent Change	As Percent of Total Package ^b	Absolute	Yearly Percent Change	As Percent of Total Package ^b
Base salary	Performance	Performance	Performance	Scale		Performance
Bonuses	Performance	Performance	Performance	Scale and performance	Scale	Performance
Long-term income	Performance	Performance	Scale and performance +	Scale and performance		Performance +
Total compensation	Performance	Performance	N.A.	Scale and performance	Scale and performance	N.A.

^a N = 19 for owner-controlled firms; N = 52 for management-controlled firms.

^b A minus sign indicates a significant negative relationship with that aspect of the compensation mix; a plus sign indicates a significant positive relationship.

study (Brigham, 1985). But the Internal Revenue Service defines most long-term income like stocks, bonds, and performance shares as capital assets that are generally nontaxable until converted into cash, when they are taxed at the rate that applies to ordinary income like salary and bonuses. Because tax regulations apply equally to all executives, they induce both owner- and management-controlled firms to distribute CEO compensation into the same categories.

This study also showed that performance does have a significant effect on executives' compensation in both owner- and management-controlled firms; however, it is a much weaker predictor of executives' compensation in the second. These findings may help explain the inconsistent results of previous studies that did not control for type of ownership. If a population consists mostly of management-controlled firms, scale is likely to be the main predictor of executives' compensation. In an owner-controlled population, on the other hand, performance is the most likely determinant of executives' compensation, with scale playing a secondary role.

Some Social Implications

Currently, executive compensation is attracting extensive critical comment—not surprising, since over the past ten years the salaries and bonuses of CEOs have increased about 40 percent faster than the average hourly earnings for nonfarm workers (Sibson & Co., 1985). CEOs' ability to influence their own pay levels, subject to few constraints, may in part explain this trend. Williams pointed out that:

In practice, contrary to the basic tenets of the [compensation] model procedure, the chief executive often has his hand in the pay setting process almost from the first step. He generally approves, or at least knows about, the recommendation of his personnel executive before it goes to the compensation committee, and may take a pregame pass at the consultant's recommendation too. Both (personnel executives and consultants) rely upon the good graces of the chief executive for their livelihood. The consultant in particular—who is typically hired by management—would like to be invited for a return engagement. The board's compensation committee doesn't operate independently of the chief executive either (1985: 66-67).

This study also has implications for compensation's role in motivating executives. Management-controlled firms clearly design compensation systems to avoid the vagaries of fluctuating performance and to take advantage of a more stable factor, size. At the same time, executives in management-controlled firms, who apparently do take advantage of performance with respect to long-term income, appeared to have the best of both worlds. Their basic salaries were functions of firm size, a relatively stable factor, their long-term incomes were greater when performance was good, and the scale of their organizations provided a downside hedge against poor performance. The managers in the owner-controlled firms were in riskier positions—they

were primarily rewarded for performance, a more variable and risky factor, in all components of compensation.

The compensation structures of management-controlled firms are not designed well enough to maximize economic efficiency and profitability. A significant literature shows that management-controlled firms tend to be risk-averse, to overstate profits, to engage in activities designed to increase size, and to engage in merger and acquisition activity (Blair & Kaserman, 1983) that may be economically inefficient (Hayes & Abernathy, 1980). Perhaps very little can be done to change this situation; the individual stockholders of management-controlled firms cannot sufficiently influence these operations, given the broad spread of ownership. Stockholders may find it difficult to form coalitions because they usually must communicate through a firm's management, which may not view such owner coalitions as in its best interests. Neither can large institutional investors be expected to join together to pressure executives in management-controlled firms to change their approach, for to a large extent, the behavior of management-controlled firms is attractive to them. Such firms typically avoid risk and protect and build assets through growth. Institutional investors may find these acceptable tradeoffs against higher profitability with more risk.

These findings raise some important normative issues about managerial accountability and power relative to owners. In an owner-controlled firm, the dominant stockholder may have the power and the incentive to align the compensation of a hired CEO with the firm's performance. Executives in management-controlled firms, on the other hand, recognize their positions as sources of discretion and may use this power to further their own interests. Such strategies, however, may not go unnoticed by investors, who discount the value of equity in those firms (Beaver & Dukes, 1973). Whether this is normatively good or bad depends on the perspective taken on the proper relationship between owners and managers. To someone who believes that owners are entitled to receive the best possible return on their investment and that they hire managers to strive for this, this situation is certainly less than desirable.

Perhaps legislation or other regulation may shift the balance of power toward equity holders and help resolve these conflicts. Tax laws may help align managers' interests with those of stockholders with respect to long-term income (Baumol, 1959; Marris, 1967); the little empirical evidence on this point is supportive. Lewellen (1968, 1969) found that deferred executive compensation increased dramatically during the 1950s and 1960s as a result of tax legislation favoring such postponement and concluded that so much of CEOs' yearly compensation in large firms was traceable to long-term income that the interests of managers and stockholders could not be easily differentiated.

Some Implications for Research and Theory

A number of interesting empirical and theoretical issues warrant consideration. For example, the small number of variables we studied im-

plies that other, excluded factors may have strong effects on the observed relationships. Differences in organizational complexity, executives' ages and tenure, customary practices, and even geographical location may affect executives' compensation.

Another issue is the impossibility of knowing the various performance outcomes under alternative stewardships. What would a firm's performance be without a particular executive? If a replacement would not do much better than an incumbent, the latter's high pay may be justified, perhaps even as compensation for the high risk of working for a company that is performing poorly.

Since the firms used in this study were among the largest U.S. corporations, there is also a question of generalizability. If we had included smaller firms, size's effects on CEOs' pay may have been more dramatic for a variety of reasons. First, the executive market is much more competitive for small firms, so replacements are easier to find and the market rate of pay for executives is lower (McCann & Hinkin, 1984; Smart, 1985). Second, because executive compensation as a proportion of total operating costs tends to be inversely related to company size, ownership's effect on CEOs' compensation should be even stronger in small firms. Finally, the consequences of poor performance by a CEO are more disastrous in small firms, since largeness and diversification tend to minimize any single individual's influence on an organization (Hall, 1977). Other evidence suggests that changing top management has less effect on organizational performance in large organizations (Grusky, 1963; Kriesberg, 1962).

Compensation mix tends to be similar for management- and owner-controlled firms. For future research, it would be interesting to determine if there are differential patterns in the structure of long-term income used in both types of firms. Many such programs are available—incentive stock options, stock option multiples, stock purchase plans, junior stocks, convertible debentures, performance shares, performance unit plans, and phantom stocks, to name a few. These differ significantly in terms of downside risks, orientation toward goal achievement, investment required from executives financing, time horizons, provisions for discretionary adjustments, restrictions in transfers or sales, and criteria used to determine payment (Ellig, 1984; Rich & Larson, 1984). Unfortunately, most of this information is unavailable in published sources, and much of it is proprietary.

Finally, the results reported here and previous research on managers' behavior in these two different types of firms suggest that *type of control* may be a vital concept for organizational theorists to consider. McEachern (1975) and this study have shown that these two types of firms approach paying top executives differently. Other studies have demonstrated differences in accounting practices, risk aversion, profitability, and propensity to engage in growth-oriented activities like mergers. If all these actions are components of the strategies of firms, type of control may be usefully integrated into the literature about organizational strategy and environmental adaptation. For instance, although Snow and Hrebiniak (1980) did not find

differences in strategic approaches as a function of environmental uncertainty, it is quite possible that strategic approaches differ by type of control. For example, management-controlled firms may tend toward defensive and reactive strategies, and owner-controlled firms may be analytical and entrepreneurial. Although these points are conjectural, the evidence that type of control has important effects seems very clear, and it is especially strong with respect to CEOs' pay.

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PERFORMANCE OF COMMERCIAL TELEVISION STATIONS AS AN OUTCOME OF INTERORGANIZATIONAL LINKAGES AND ENVIRONMENTAL CONDITIONS

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This study explored the effects of interorganizational linkages as a moderator between organizational performance and environmental conditions. Analyses covered 145 commercial television stations in 25 markets over a 15-year period. Results indicated that interorganizational linkages can serve to protect television stations from adverse effects of environmental complexity and scarcity, but that uncertainty has a direct effect on the performance of a station.

Most modern researchers investigating organizations take an open-systems perspective and focus on how conditions in an organization's environment affect organizational outcomes. Recently, greater attention has been directed towards understanding how organizations adapt to environmental conditions in order to enhance survival and achieve high levels of performance.

One important strategy for protecting an organization from adverse environmental conditions is the establishment of interorganizational linkages—voluntary ties with other organizations. Previous research has found that these linkages increase organizational power (Hall, Clark, Giordano, Johnson, & Van Roekel, 1977; Pfeffer & Leong, 1977; Provan, 1982; Provan, Beyer, & Kruytbosch, 1980), reduce uncertainty (Ford & Slocum, 1977; Hirsch, 1975), and increase performance by ensuring a stable flow of critical resources (Pennings, 1981; Pfeffer & Salancik, 1978). Despite the growing interest in the effects of interorganizational linkages on organizational outcomes, empirical research examining the specific effects of environmental conditions on the development of interorganizational linkages is lacking.

Theorists have developed several approaches to explaining and predicting (1) the conditions under which organizations choose to increase or decrease their dependence on other organizations, and (2) how those dependen-

We wish to thank Herb Heneman III, Janet Near, Donald P. Schwab, and the anonymous reviewers for their insightful comments and critiques on an earlier draft of this paper.

cies affect organizational outcomes. Early work by Thompson suggested that organizations may enter into exchange relationships to reduce environmental uncertainty by achieving negotiated environments (1967: 34). Imperfect knowledge and resource fluctuations in an environment may induce organizations to engage in exchange relationships to make the acquisition of resources more predictable over time. The resource dependence approach (Pfeffer & Salancik, 1978) identified scarcity of resources in organizations' environments as a major factor leading them to increase their interorganizational dependencies. Increased dependencies appear to be necessary not only to insure survival by obtaining critical resources, but also to improve the overall performance of an organization.

Finally, Aldrich (1979: 30, 66–67) suggested that the complexity of resources in an environment promotes interorganizational dependence. Resource complexity requires organizations to establish multiple products or services, thus contributing to a higher level of interorganizational interaction to obtain multiple resources. Adding interorganizational linkages increases complexity for an organization, but the process can reduce uncertainty if it is managed adroitly. However, indiscriminately added linkages may increase organizational uncertainty (Pfeffer & Salancik, 1978: 27–29). Therefore, it is important that organizations manage and coordinate additions of interorganizational linkages in order to achieve the desired effect of reducing environmental uncertainty.

Each of these three theoretical approaches identifies environment as a major factor influencing an organization's level of dependence on other organizations. Despite these theoretical developments, researchers have not adequately pursued empirical analysis comparing and contrasting the effects of different environmental conditions and interorganizational arrangements on the performance of organizations. These theoretical perspectives on relationships between environmental conditions, interorganizational linkages, and organizational performance provide the foundation for this study, in which we analyzed 145 television stations in 25 markets over 15 years. Commercial television stations appeared particularly suited for studying these theoretical issues for several reasons. First, they operate in well-specified environments—media markets—where they compete for resources. Second, markets differ in amounts and diversity of resources available, producing a range of environmental conditions to be studied. Finally, television stations can establish a variety of linkages for securing resources from their environments. This research extends previous work by specifically examining relationships between different environmental conditions, interorganizational dependencies, and performance.

BACKGROUND AND HYPOTHESES

The dominant theoretical perspective taken in the study of interorganizational relationships is exchange theory, which is based on the assumption that organizations perform specialized functions and therefore cannot produce all their inputs or consume all their outputs. Specialization forces

organizations to enter into exchange relationships, or resource dependencies, with other organizations, and the nature and structure of these dependencies can either promote or hinder organizational survival and success.

Meyer and Rowan (1977) argued that survival for organizations operating in highly institutionalized environments depends more on conforming to externally imposed rules and beliefs than on efficient production of outputs. Organizational structures that conform to institutional rules "maximize their legitimacy and increase their resources and survival capabilities" (Meyer & Rowan, 1977: 352). Commercial television stations operate in an institutionalized environment in that the Federal Communications Commission (FCC) grants their licenses to operate and regulates their behavior. Television stations tend to follow institutionalized rules and practices in the exchange process that, consistent with Meyer and Rowan's view, leads them to derive power and resources from organizations in their environments.

Environmental Uncertainty and Interorganizational Linkages

Aldrich and Mindlin (1978) defined uncertainty as existing when relationships between organizations are unpredictable. Some of the causes of uncertainty include imperfect knowledge of (1) environmental fluctuations, (2) available exchange partners, and (3) available rates of exchange in an interorganizational field (Cook, 1977). Both Thompson (1967) and Pfeffer and Salancik (1978) asserted that organizations cope with such uncertainty by adapting internal organizational structures and by engaging in exchange relations to make the process of acquiring resources more predictable. However, Cook (1977: 67–70) argued that organizations within the same resource exchange category will not establish exchange relations because they compete for resources, so interorganizational linkages will only occur across exchange categories.

Commercial television stations confront environmental uncertainty when acquiring both advertising revenues and programming materials. Advertising dollars, the largest source of income to television stations, are generally the more difficult to obtain. Gross expenditures by advertisers in any given market can fluctuate from year to year depending on the methods they use and the types of audiences they seek to reach. For example, in a given year, a market with many school age children may draw high levels of advertising expenditures, only to have expenditures dramatically drop the next year if producers are no longer targeting that audience. Such fluctuations induce high uncertainty for managers of commercial television stations because they are unable to accurately predict the amount of advertising dollars they will receive in the future.

Although regulations restrict commercial television stations from establishing formal resource exchanges with other commercial television stations operating in the same market, they can use other viable interorganizational arrangements to reduce environmental uncertainty. We identified five such arrangements as important resource linkages for commercial television stations: (1) affiliation with networks and commercial television stations

operating in other markets, (2) affiliations with radio stations and newspaper organizations, (3) contractual agreements with industry consultants who provide knowledge or services, and (4) contractual agreements with wire services.

Establishing resource exchanges with other media-related organizations enables commercial television stations to stabilize and predict acquisition of advertising dollars. Network affiliation provides long-term contractual agreements for sharing revenues from advertisements that are aired during programs originating from the network. Common ownership or affiliation with stations operating in other markets can generate long-term agreements over revenue sharing for advertisers who want to reach selected markets. Radio and newspaper affiliations promote contractual arrangements with advertisers seeking to reach audiences through multiple media outlets. Contractual agreements with industry consultants enables stations to obtain pertinent market information when needed. Wire services provide resources pertinent to programming news and community information for audiences.

Establishing contractual resource exchanges serves to maintain an orderly flow of resources for commercial television stations. Thus, stations in uncertain markets with more resource linkages than other stations should perform better than stations with fewer resource linkages.

Hypothesis 1: When advertising expenditures in a market fluctuate, number of resource linkages will be positively related to a television station's acquisition of revenues.

Environmental Scarcity and Interorganizational Linkages

Commercial television stations operate in markets that vary as to availability of resources. Whereas environmental uncertainty refers to the degree to which available resources fluctuate, environmental scarcity refers to the quantity of resources available to a group of competitors. Scarcity is, therefore, a function of the amount of advertising expenditures and the number of competing stations in a market.

Yuchtman and Seashore (1967) suggested that an organization's success in competing for resources over time indicates its effectiveness. Organizations may, however, select different competitive strategies, one being the establishment of interorganizational dependencies. Dependencies may be advantageous in environments with scarce resources because they enhance long-term commitments of resource support and offer means of achieving favorable resource exchanges (Aldrich, 1979; Laumann, Galaskiewicz, & Marsden, 1978; Schermerhorn, 1975; Thompson, 1967; Van de Ven, 1976).

When scarcity of resources increases in a market, commercial television stations will increase linkages as a method for securing critical resources and improving revenue acquisition.

Hypothesis 2: When advertising expenditures per television station are low, number of linkages will be positively related to a station's acquisition of revenues.

Environmental Complexity and Interorganizational Linkages

Aldrich (1979) most clearly presented the relationship between environmental and interorganizational complexity, suggesting that increases in environmental complexity increase need for strategic activities by organizations. He argued that environmental complexity triggers a mirror response: high environmental complexity, or differentiation, rewards high interorganizational complexity, or differentiation among linkages, and low environmental complexity, or similarity, rewards organizations with similarity of interorganizational linkages.

Dess and Beard (1984) supported this claim, asserting that managers facing differentiated environments will have greater information processing requirements than managers facing simple environments. An organization competing in an industry that requires many different inputs or that produces many different outputs should find acquiring resources and disposing of outputs more complex than will an organization competing in an industry with fewer different inputs and outputs, because the first organization must interact with a large number and variety of other organizations to procure critical resources.

Commercial television stations' markets vary considerably as to the complexity of viewers' characteristics. A study conducted by A. C. Nielsen (1975) television rating service notes that three demographic characteristics of a television viewer are powerful predictors of viewing habits: age, education, and income. Income levels in South Bend, Indiana tend to be more homogeneous than income levels in San Francisco, California. Age groups are more differentiated in New York City than in Phoenix, Arizona, and the citizens of Des Moines, Iowa have greater similarity in educational attainment than do the citizens of Boston, Massachusetts. In general, some markets can be classified as heterogeneous in demographic characteristics—and therefore complex—and other markets can be classified as homogenous in demographic characteristics.

In this research, we measured market complexity in terms of demographic characteristics of populations and measured interorganizational complexity in terms of the types of linkages commercial television stations have with other media organizations. In order to assess degree of interorganizational complexity, we developed a four-cell classification scheme based on transactional content, the number of resources exchanged between two organizations, and on transactional flow, the continuous or intermittent quality of exchanges. Figure 1 depicts these four classifications: cell 1, where resource exchanges are multiple and continuous; cell 2, where exchanges are continuous and singular; cell 3, where exchanges are multiple and intermittent; and cell 4, where exchanges are singular and intermittent. Multiple and continuous exchanges occur where organizations transfer more than one resource daily. An example is an affiliation between a network and a station established for the purpose of transferring programs, advertising revenues, market analyses, consultations, and so forth. Singular and continuous exchanges exist when

one resource is transferred continuously. Wire services, such as those offered by the Associated Press, United Press International, and Reuters, offer this form of exchange, transferring a single resource—news information—to stations daily. Multiple and intermittent exchanges occur at unplanned intervals and are prompted by perceived need. Affiliations with newspapers and radio stations represent this form of exchange, in which organizations transfer information and advertising revenues in a manner that is unpredictable over time. Singular and intermittent exchanges also occur at unplanned intervals and according to perceived need. Thus, we could classify the interorganizational set of commercial television stations in terms of linkages across and within the four categories displayed in Figure 1.

Interorganizational complexity is a product of the degrees of similarity and differentiation among linkages. If a commercial television station were to have eight linkages, and all eight were classified in one cell, we would assert that linkages were similar. However, if the eight linkages were distributed among the four cells—for example, two linkages classified in each of the four cells—linkages of the organization would be differentiated. Complexity of linkages is not a product of their location in a particular cell, but of their distribution among cells: the wider the distribution, the more complex the interorganizational linkages of a commercial television station.

Hypothesis 3: The interaction between market and linkage complexity is such that complementary levels of both will be positively related to a station's acquisition of revenues.

FIGURE 1
Classification of Resource Exchanges Made by Television Stations

		TRANSACTIONAL CONTENT	
		Multiple	Singular
TRANSACTIONAL FLOW	Continuous	1. Network affiliations (ABC, CBS, NBC, CBN, SPN, etc.) 2. Station affiliations (Group W, Metromedia, Storer, etc.) Cell 1	Wire services (AP, UPI, Reuters, etc.) 1. News and information 2. Film 3. Facsimile Cell 2
	Intermittent	Cell 3 1. Newspaper affiliations 2. AM radio affiliations 3. FM radio affiliations 4. Cable TV affiliations	Cell 4 1. Engineering consultants 2. Legal consultants 3. Sales consultants

METHODS

Data Sources and Sample

Selecting commercial television stations as the type of organization for this study was based on several characteristics: federal restrictions of operation to clearly defined markets, the similarity in both structure and technology that stations share across markets, and the opportunities stations have to engage in multiple types and forms of linkages with other organizations. We collected data on 145 commercial television stations in the United States in 25 markets for 1966–80, primarily from four archival sources: (1) the *Financial Report on Television Broadcast Service* (Federal Communications Commission), published annually; (2) *Television Factbook* (Television Digest, Inc.), an industry trade journal published yearly and providing information on station operations; (3) *A. C. Nielsen Television Ratings* (A. C. Nielsen Company), a quarterly publication measuring market shares of commercial television stations; and (4) the 1960, 1970, and 1980 *Census of the Population* (United States Bureau of the Census), with interpolation of statistics for intervening years. Supplemental information was obtained from in-depth interviews with seven general managers of stations in 1980. Table 1 presents a summary of the variables, sources of data, and years of collection.

The stations were selected by stratified sampling within the largest 100 television markets as measured by number of households in 1980. First, we included all commercial stations in the top ten markets ($n = 81$), which assured adequate environmental diversity within the 100 markets. Second, we took all commercial stations in a random sample of 15 of the remaining 90 markets ($n = 64$), considering such stratification appropriate to obtain adequate variation in market conditions like uncertainty, scarcity, and complexity. This step also conformed to the stratified sampling technique

TABLE 1
Variables and Sources of Data

Variables	Sources	Years
Performance		
Station revenues	<i>Financial Report on Television Broadcast Service</i> <i>A. C. Nielsen Television Ratings</i>	1965–80 1965–80
Linkages		
Numbers of linkages	<i>Television Factbook</i>	1965–80
Complexity of linkages	<i>Television Factbook</i>	1965–80
Market		
Uncertainty	<i>Financial Report on Television Broadcast Service</i>	1965–80
Scarcity	<i>Financial Report on Television Broadcast Service</i> <i>Television Factbook</i>	1965–80 1965–80
Complexity	<i>Census of the Population</i>	1960, 1970, 1980

prescribed by Blalock (1972: 516–523). We decided to select 25 markets for the sample in order to have a sample large enough to avoid bias. The result was a maximum of 145 stations. Table 2 shows markets and numbers of stations in operation by year.

Data were collected on each station for each of the 15 years between 1966 and 1980. If all stations had had continuous transmissions in this period, the resultant number of observations would have been 2,175 (15 years times 145 stations). However, complete data were available only for 99 of the stations. For the remaining stations, data were incomplete because they started after 1966, discontinued operations, or suffered temporary interruptions in broadcasting. We discarded any years in which data for a station were incomplete; the actual number of observations remaining was 1,540.

Dependent Measure: Station Performance

The relative percentage change in yearly acquisition of advertising revenues in a station's market was the measure of its performance. To calculate this figure, we first estimated yearly advertising revenues for each station by

TABLE 2
Commercial Television Station Markets Included in Sample

Markets	Ranks ^a	Stations in Operation by Year			
		1965	1970	1975	1980
New York, New York	1	7	8	9	10
Los Angeles, California	2	9	12	13	13
Chicago, Illinois	3	5	7	7	8
Philadelphia, Pennsylvania	4	4	6	6	6
San Francisco, California	5	4	8	8	9
Boston, Massachusetts	6	4	5	5	7
Detroit, Michigan	7	5	6	7	7
Washington, D.C.	8	5	6	5	5
Cleveland, Ohio	9	3	5	4	4
Dallas/Ft. Worth, Texas	10	4	7	5	5
Atlanta, Georgia	16	3	5	5	6
Seattle, Washington	18	5	5	4	5
Baltimore, Maryland	19	3	4	4	4
Milwaukee, Wisconsin	25	4	4	4	5
Kansas City, Missouri	27	3	4	4	5
Phoenix, Arizona	33	4	5	5	7
Albany, New York	45	3	3	3	3
Richmond, Virginia	56	3	3	3	3
Shreveport, Louisiana	59	3	3	3	3
Mobile, Alabama	62	3	3	3	3
Des Moines, Iowa	63	3	3	3	3
Springfield, Illinois	71	3	3	3	4
South Bend, Indiana	78	3	3	4	4
Peoria, Illinois	88	3	3	3	3
Tucson, Arizona	91	3	4	4	4
Totals		99	125	124	136

^aMarket rank is by total television households as of 1980.

multiplying the station's market share by total advertising expenditures in the market. Information on market shares came from the A. C. Nielsen Company, which surveys television audiences throughout the year; information on total market advertising expenditures came from Federal Communications Commission documents. Second, we calculated the percentage change in advertising revenues from the previous year to determine if the station's acquisition of advertising revenues had increased or decreased, and finally, adjusted the result of this calculation to the mean percentage change in revenues for all stations competing in a market. This adjustment served to remove comparative bias in stations' acquisition of revenues due to yearly differential rates of advertising expenditures across markets.

For instance, if total advertising expenditures for market A were \$1,000 in one year and \$800 in the previous year, and station B had a market share of .20 in both years, estimated revenue acquisition for the second year would be $[(1,000 \times .20) - (800 \times .20)] / (800 \times .20)$, a 25 percent increase in revenue acquisition from the first to the second year. However, this estimate reflects an absolute increase in obtaining advertising revenues, as the market share of station B remained constant for the two years. In order to reflect relative acquisition of revenues, we adjusted station B's level of acquisition by subtracting the percentage change in revenue acquisition from the percentage change in revenue acquisition for all stations in market A. Thus, if all stations experienced 25 percent increases in market share over the two years, the adjusted percentage change for station B would be 0 (.25 - .25). The adjustment is necessary in order to account for differential growth rates across markets that may artificially increase or decrease stations' acquisition of revenues. The Appendix reports the formulas used for calculating this variable as well the independent variables.

Our measure of revenue acquisition does not take into account profits before or after taxes, because the FCC restricts access to such financial data. Nevertheless, this measure has several positive characteristics: (1) Measures of profit per se are not necessary to investigate how stations establish linkages to acquire resources, which was our primary focus. (2) Levin (1980) showed that estimates of revenues for 632 commercial television stations were highly correlated with measures of market share, audience size, and price listings for spot advertising. (3) Assessing a station's level of revenue acquisition relative to those of other stations in its market removes bias resulting from inflation and accelerated rates of spending by advertisers for television time, which was pronounced during this period. (4) Percentage change in revenues controls for variations in revenues across and within markets. Hence, the measure of station revenue acquisition applied in this study indicates how well a station performed in acquiring resources relative to the other stations within its market and enables similar comparisons of performance across markets.

Independent Measures: Linkages

There were four measures of station linkages: number of linkages (L_1), complexity of linkages (L_2), similar linkages (L_{2a}), and diverse linkages (L_{2b}).

The Appendix gives the formulas for these measures. We collected data from *Television Factbook* (Television Digest, Inc.) from 1965 to 1980. This source reports (1) network and station affiliations; (2) affiliations with newspaper, radio, and cable organizations; (3) contractual agreements with engineering, legal, and sales consulting organizations; and (4) subscriptions to wire services. We considered each of these four categories as a form of resource exchange.

To measure numbers of linkages, we assigned a value of 1 to each reported resource exchange and a value of 0 where no resource exchange was reported, and summed across all exchanges. To measure complexity of linkages, we first classified resource exchanges into four categories, basing classifications on extensive discussions with general managers from seven stations. From these discussions, the two dimensions of resource exchanges emerged—transactional flow and transactional content—both defined in the Background and Hypotheses section and depicted in Figure 1. After classifying a station's resource exchanges into the four cells, we applied the following measure of complexity: $C = \Sigma(l_i^2)/L^2$, where l_i is the number of observations or resource exchanges, within the i th category, and L is the total number of linkages established by a station across all categories. According to this formula, the higher the calculated value, the more similar a station's resource exchanges are to one another; the lower the value, the more complex its resource exchanges are. For example, if a station had a total of eight resource exchanges, all exchanges of one type—located in one category—the value of C would equal 1.0: $(8^2 + 0^2 + 0^2 + 0^2)/8^2$. On the other hand, a station with eight resource exchanges evenly distributed among the four categories would have a value of .25: $(2^2 + 2^2 + 2^2 + 2^2)/8^2$. This technique allows measurement of linkage complexity with values ranging from 0 to 1.0. Gibbs and Martin (1962) originated the formula, using it for measuring population diversity through categorization of demographic traits. Table 3 presents the frequency of resource exchanges by categories.

The complexity measure was then trichotomized into equal thirds, and two dummy variables (L_{2a} and L_{2b}) created. A complexity score of greater than or equal to .38 was considered to indicate similar linkages, and L_{2a} was coded 1; $C \leq .31$ was considered as indicating diverse linkages, with L_{2b} coded 1. We placed stations falling between these two scores in the omitted variable category. This technique follows a suggestion by Draper and Smith (1981: 241–250) for testing metric slope differences; it is in some ways statistically similar to performing separate analyses, but has the advantage of assessing all measures simultaneously. We entered interactions between market complexity and both forms of station linkages into the equation. If the additive model explained significantly less variance than the interactive model, we could reject the contention that linkage complexity has no effect on station's performance.

Independent Measures: Market Uncertainty, Scarcity, and Complexity

Market uncertainty (M_1) was measured by the absolute percentage change in advertising expenditures within a market from the prior year. Markets that

TABLE 3
Frequency of Resource Exchanges by Cell Categories

Linkage Categories	Number of Linkages ^a									
	1	2	3	4	5	6	7	8	9	10
Cell 1: Multiple and continuous										
Network affiliations										
American Broadcasting	352									
Columbia Broadcasting	348									
National Broadcasting	350									
Christian Broadcasting	14									
Spanish Broadcasting	66									
Number of station affiliations	235	239	141	388	177	91				
Cell 2: Continuous and singular										
News and information										
Associated Press	1,112									
United Press International	1,278									
Other (Reuters, etc.)	185	12	3							
Films										
Associated Press	6									
United Press International	65									
Other (Reuters, etc.)	683	15	1							
Facsimiles										
Associated Press	364									
United Press International	738									
Other (Reuters, etc.)	12									
Cell 3: Multiple and intermittent										
Newspaper affiliations	461									
AM radio affiliations	949	157	123	119	191	248	53	8	2	5
FM radio affiliations	1,000	195	95	92	133	197	9			
Cable TV affiliations	608									
Cell 4: Intermittent and singular										
Engineering consultants	943									
Legal consultants	1,385	19								
Sales consultants	1,422	118	28	6	6	4				

^aNumerals represent the total number of stations across 15 years that were reported to have the number of linkages identified for each category. For example, there were 91 instances during the period that stations had affiliations with six other stations.

have stable rates of growth or decline in advertising expenditures suggest high predictability of revenues for station managers, and large percentage increases or decreases indicate uncertainty. Each station received the appropriate score for its particular market.

Market scarcity (M_2) was calculated by dividing total market advertising expenditures by the total number of households in a market. We then divided this value by the total number of stations competing in the market. This measure suggests that resource scarcity is not only a function of per capita expenditures, but an outcome of the number of stations competing for advertising dollars. A low value indicates that advertising expenditures per person are scarce relative to the number of stations operating in the market; a high value indicates that advertising expenditures are munificent.

Market complexity (M_3) was measured on the basis of demographic distributions of age, education, and wealth within a market's Standard Metropolitan Statistical Area. Prior research by the A. C. Nielsen Company (1975) suggested that these three traits were the strongest predictors of program selection and television viewing habits. United States Census records provided the data on the distribution of market populations by age, education, and wealth. We again used Gibbs and Martin's (1962) formula to measure market complexity. Since U.S. Census data are collected once a decade, we interpolated each complexity measure, using the average increase or decrease of value over the ten years. The intercorrelations were reasonably high, suggesting it was appropriate to combine them into a single index of market complexity. A high complexity score suggests that on the whole, a market is demographically homogeneous, and a low value indicates a market is heterogeneous or differentiated across the three demographic measures. Table 4 shows intercorrelations between the three separate complexity measures for age, education, and wealth.

Statistical Analysis

The data in this study were analyzed by a method of pooling cross-sectional and time series data (Hannan & Young, 1977). Such pooling is an effective analytic technique under certain conditions. For instance, one major problem associated with the use of multivariate regression techniques with a small number of cases is the possibility that exceptional or outlying cases will heavily influence coefficients. By increasing the sample's size, pooling made this problem less likely, which was particularly important as our analysis evaluated both levels and rates of change simultaneously.

An additional concern when using time series or panel data is the assumption that observed—and unobserved—differences in units have a relatively unimportant effect on dependent variables. In the absence of controls for these effects, the likelihood of biased estimates is high. To ensure that no nonrandom differences were embedded in the data, we employed a fixed-effects model that enables nonrandom effects to be differenced out and thus removes bias from estimates (Blalock, 1972). The following equation expresses a model in which a television station's performance (P_{it}) is an outcome of station linkages (L_{it}) and market variations (M_{it}):

$$(P_{it} - P_{it-1}) = (L_{it} - L_{it-1}) + (M_{it} - M_{it-1}) + (\epsilon_{it} - \epsilon_{it-1}),$$

where $i = 1, 2, \dots, 1540$, and $t = 1, 2, \dots, 15$.

Hypothesis 3 explicitly specifies interaction effects. Because of this, we used both an additive and an interactive regression model (Draper & Smith, 1981). Of concern were (1) whether the interactive model explained significantly more variance than the additive model, and (2) the significance of the regression coefficients for the interaction terms.

TABLE 4
Intercorrelations^a, Means, and Standard Deviations
for All Variables and Interaction Terms

Variables	Means	s.d.	P ₁	L ₁	L ₂	L _{2a}	L _{2b}	M ₁	M ₂	M ₃	M _{3a}	M _{3b}	M _{3c}	I ₁	I ₂	I ₃	I ₄	I ₅
P ₁ : Performance	.034	.845		.03	-.08	.04	-.04	-.12	-.02	.04	.03	.03	.04	-.03	-.02	.02	-.03	.07
L ₁ : Number of linkages	14.193	6.850			-.14	.03	.01	-.04	-.03	-.04	.01	.10	-.29	-.18	.39	.16	-.04	-.04
L ₂ : Complexity of linkages	.372	.128				-.18	.10	-.01	.01	.01	.14	.22	.19	.05	-.05	-.04	.06	-.02
L _{2a} : Similar linkages ^b	.317	.465					-.49	-.02	-.04	.01	-.05	-.19	-.04	-.03	.01	.01	-.35	.13
L _{2b} : Diverse linkages ^c	.349	.474						.02	.06	-.02	.09	.15	.04	.02	-.02	-.03	.17	-.27
M ₁ : Market uncertainty	.123	.092						.38	.11	.02	-.14	.06	.04	.02	-.02	.00	.06	.06
M ₂ : Market scarcity	.004	.003							.09	.10	.15	-.12	.00	.08	.01	.02	.42	.69
M ₃ : Market complexity	.539	.034								.55	.49	.61	.06	.01	.02	.01	.33	.29
M _{3a} : Age complexity	.070	.003									.20	.45	.07	.02	.01	.02	.22	.27
M _{3b} : Education complexity	.195	.021										.20	.45	.07	.02	.01	.33	.29
M _{3c} : Income complexity	.106	.016											.20	.45	.07	.02	.22	.27
I ₁ : L ₁ × M ₁	-.011	.257												.03	.01	.04	-.09	.11
I ₂ : L ₁ × M ₂	-.002	.034												.05	.01	.17	.46	.03
I ₃ : L ₁ × M ₁ × M ₂	.000	.000														.32	.01	.01
I ₄ : L _{2a} × M ₃	-.002	.008															-.01	.02
I ₅ : L _{2b} × M ₃	-.002	.013																-.05

^aCorrelations greater than .05 are significant at $p < .05$.

^bDummy variable, with 1 = measure of linkage complexity in upper one-third of sample, 0 = in lower two-thirds of sample.

^cDummy variable, with 1 = measure of linkage complexity in lower one-third of sample, 0 = in upper two-thirds of sample.

RESULTS

Table 4 reports the means, standard deviations, and intercorrelations for the measures. Inspection of the last reveals no substantial multicollinearity among the independent variables used in the regression analysis.

Table 5 contains the regression results for both the additive and interactive models. It can be seen that both models explained significant portions of the variance in the performance of stations. The interactive model's incremental contribution to explained variance is significant at the .01 level. Since the interactive model allows better fit than the additive model, we used it to test the other hypotheses as well. One-tailed *t*-tests appear for the coefficients because the hypotheses stated the signs of the coefficients.

Hypothesis 1 states that under conditions of market fluctuations in advertising expenditures, number of resource linkages will be positively related to a station's performance. A positive coefficient in I_1 would suggest that increased uncertainty accompanied by increased linkages would raise level of performance, as would fewer linkages in a certain market. The strong negative and significant relationship between uncertainty and performance reported in measure M_1 ($b = -.542$, $p < .01$), however, indicates that this effect is direct and does not interact with the number of linkages. These results emphasize the impact that large fluctuations in total market advertising expenditures have on television stations' acquisition of revenues.

Hypothesis 2 predicts that when advertising expenditures are high for each station, number of linkages will be positively related to performance.

TABLE 5
Results of Regression Analyses of the Effect of Variables
and Interaction Terms on Stations' Performance^a

Explanatory Variables	Additive Model		Interactive Model	
	<i>b</i>	β	<i>b</i>	β
Intercepts	.081		.100	
L_1 : Number of linkages	.002	.006	.001	.004
L_2 : Complexity of linkages	.008**	.086	.007	.079
L_{2a} : Similar linkages	.073	.056	.065	.050
L_{2b} : Diverse linkages	.039	.030	.004	.003
M_1 : Market uncertainty	-.539**	-.129	-.542**	-.130
M_2 : Market scarcity	35.422	.039	33.812	.037
M_3 : Market complexity	-1.942*	-.055	.852	.024
I_1 : ($L_1 \times M_1$)			-.188	-.036
I_2 : ($L_1 \times M_2$)			-33.891	-.044
I_3 : ($L_1 \times M_1 \times M_2$)			-54.926	-.015
I_4 : ($L_{2a} \times M_3$)			.950**	.010
I_5 : ($L_{2b} \times M_3$)			-4.204**	-.064
R^2	.19		.23	
<i>F</i>	4.97**		5.60**	

^a $N = 1,540$

* = $p < .05$

** = $p < .01$

The interactive term I_2 expresses this prediction; the coefficient obtained is negative ($b = -33.891$) and significant ($p < .05$). Its negative direction indicates that as the expenditures per capita in a market decreased, an increase in the numbers of linkages increased a station's revenues relative to market competition.

The test of Hypothesis 3 required a trichotomization of the complexity of linkages. We predicted an interactive effect between market and linkage complexity such that complementary levels of both would be positively related to performance. The term I_4 represents the interaction between similar linkages and market complexity, and I_5 represents the interaction between diverse linkages and market complexity; we predicted them to be respectively positive and negative. I_4 was significant ($p < .01$), with a positive coefficient ($b = .950$), which indicates that stations with high similarity among their linkages and low complexity in their markets' demographics exhibited higher levels of performance than stations with diverse linkages in markets of low complexity. I_5 was negative ($b = -4.204$) and significant ($p < .01$), indicating that stations with diverse linkages in markets of high complexity performed better than stations with diverse linkages in markets of low complexity.

DISCUSSION

This research was designed to assess how interorganizational linkages moderate the relationship between organizational performance and environmental variations. We tested three environmental conditions and two structural forms of interorganizational linkages to determine their effects on organizational performance. The results partially demonstrate that, within a set of organizations interacting closely with their environments, interorganizational arrangements can increase organizational performance when correctly matched with environmental dimensions.

The results reported here clearly indicate that the commercial television stations examined could counter scarcity of advertising expenditures in their markets by increasing linkages with resource providers. These linkages may provide important programming information to station managers, thereby enabling a station to attract a larger audience. Because an increase in audience numbers will increase a station's relative market share, it will then be able to acquire a larger share of the advertising expenditures in its media market. Under conditions of resource scarcity, stations that expand their relative market shares will be able to perform better than their competitors.

Additional results show that complexity of linkages, when matched to demographic characteristics, can also enhance the performance of television stations. This finding may provide an important insight into the management of commercial television stations, suggesting that station managers might deal with established and potential linkages with resource providers as if managing investment portfolios. Simply increasing the number of resource linkages may not fully satisfy all market conditions. When market

demographics are homogeneous, station managers may have greater success by establishing linkages that are similar. Heterogeneous market conditions, on the other hand, suggest that station managers need to diversify their portfolios of linkages with resource providers in their environments. This analysis cannot determine whether diversity counterbalances divergent market trends or fits an organization to environmental conditions.

In one instance, we did not obtain the predicted outcome. Environmental uncertainty was found to have a strong and negative direct effect on organizational performance. This finding implies that linkages did not moderate the effects of uncertainty, but did enhance performance under conditions of market scarcity and complexity. There are three plausible explanations for this result. First, revenue expenditures in a market are highly disproportionate among competing stations. Therefore, large increases or decreases in overall expenditures for advertising may have differential effects on stations, with only a few acquiring sizeable proportions of an increase or maintaining levels of revenue acquisition comparable to a prior year despite a decrease. As a result, most stations in a market would obtain small increases in revenues when expenditures are large and most would suffer large losses in revenues when total market expenditures decrease.

A second possible explanation of the direct negative effect that large fluctuations in advertising expenditures have on stations' acquisition of revenues may involve variations in the content of linkages. The linkages measured in the study provide various forms of resources, not all of which may have direct relationships with advertising revenues. Network affiliation, sales representatives, and other media outlets may provide direct avenues of revenue acquisition, but linkages with wire services and legal consultants may have indirect effects. Thus, actual numbers of linkages may be secondary to their content in predicting the performance of commercial television stations under conditions of market uncertainty. Lacking specific knowledge of the content of exchanges between each station and its resource providers, we could not test this argument.

Finally, the results may be an artifact of station managers' having to manage multiple linkages, which may reduce overall performance levels. Pfeffer and Salancik (1978) noted that organizations enter dependency relationships to counter environmental uncertainty, but also noted that interdependence itself can bring further uncertainty, created by lack of coordination and a high volume of linkage activities to manage.

CONCLUSIONS AND LIMITATIONS

Results of this research refine the open-systems perspective by indicating that organizational performance cannot be solely understood as an outcome of environmental conditions. Investigators need to examine interorganizational linkages in terms of both numbers and complexity as possible moderating variables. Examining how linkages affect organizational performance can further understanding of how an organization's context influences organizational outcomes.

Future research could expand on the findings of this study in several ways. First, it would be useful to examine whether the results apply to other organizational populations. As we observed, commercial television stations are closely linked to their environments. Populations of organizations further removed from environmental variations may provide different outcomes when tested with a similar research design.

Second, future research should further delineate and refine categories of interorganizational linkages by focusing on (1) specific resource transfers within linkages, and (2) the criticalness of resources to a receiving organization. Furthermore, we recognize that our method of measuring diversity of linkages does not identify the cells in which observations congregate. For instance, the formula used to measure complexity only addresses the degree of observed dispersion across cells and does not differentiate between stations that have aggregated their linkages in one cell and stations that have aggregated linkages in another cell. Hence, a station with ten linkages all in cell 2 and a station with three linkages all in cell 4 would have the same value.

Finally, we recognize that our estimated measure of station performance is not ideal and may contain unobserved biases. The method used may not be appropriate for studying organizational performance in other regulated industries. The credibility of this measure rests largely in the fact that pricing among television stations is closely linked to market share ratings by Nielsen and Arbitron. Outside of media organizations, this connection may not exist. However, future research should attempt to refine methods of measuring performance in terms of revenues when factual information is inaccessible.

This research should prove useful to managers in the television industry and in other industries, in part because as deregulation and merger activity increase, environmental uncertainty, resource scarcity, and resource complexity are sure to increase. If these trends hold true, station managers can begin to adjust the linkages of their stations to more closely conform to market conditions. This strategy may also be appropriate for organizations in such service industries as banking, travel, and accounting.

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APPENDIX

To compute the dependent and independent variables, these formulas were used.

Performance of stations:

$$P_1 = RP - MMP,$$

$$RP = \frac{(SMS \times MAE)_{t0} - (SMS \times MAE)_{t-1}}{(SMS \times MAE)_{t-1}},$$

where P_1 = overall station performance, RP = relative station performance, SMS = station's market share, MAE = market's advertising expenditures, MMP = mean market performance, and t = year.

Number of linkages:

$$L_1 = \Sigma l,$$

where L_1 = total number of linkages and l = individual linkages of station.

Complexity of linkages:

$$C = \frac{\Sigma(LC^2)}{L^2},$$

where C = complexity of linkages, L = total number of linkages, and LC = linkage categories.

Similar linkages:

$$SL = C \geq .38,$$

where SL = similar linkages and C = complexity of linkages.

Diverse linkages:

$$DL = C \leq .31,$$

where DL = diverse linkages and C = complexity of linkages.

Market uncertainty:

$$MU = \left| \frac{MAE_{t0} - MAE_{t-1}}{MAE_{t-1}} \right|,$$

where MU = market uncertainty, MAE = market's advertising expenditures, and t = year.

Market scarcity:

$$MS = \frac{MAE}{NS},$$

where MS = market scarcity, MAE = market's advertising expenditures, and NS = number of stations operating in market.

Market complexity:

$$MC = AGC + EDC + INC,$$

$$AGC = \frac{\Sigma(AC)^2}{A^2},$$

$$EDC = \frac{\Sigma(ED)^2}{E^2},$$

and

$$INC = \frac{\Sigma(IN)^2}{I^2},$$

where MC = market complexity, AGC = age complexity, EDC = education complexity, INC = income complexity, AC = age categories (ten categories 0-10, 11-20, . . . , 91+), A = total population of market, ED = education categories (six categories, 0-8, 8-11, 12, 13-15, 16, 17+), E = total population of market, 25 years or older, IN = household income categories (six categories, \$0-4,999, 5,000-9,999, 10,000-14,999, 15,000-24,999, 25,000-49,999, 50,000+), and I = total households in market.

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THE ROMANCE OF LEADERSHIP AND THE EVALUATION OF ORGANIZATIONAL PERFORMANCE

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Suggesting that as an explanatory concept, leadership has assumed a heroic, larger-than-life quality, this research investigated the effects of leadership attributions on evaluations of organizational performance. In study 1, we found that subjects gave better evaluations to performance outcomes attributed to leadership factors than they gave to the same outcomes when these were attributed to nonleadership factors. Study 2 sought specific information on the nature and quality of leadership's value as an explanatory concept for performance outcomes through analyzing the attributions themselves. The discussion focuses on the phenomenological value and significance of leadership for the analysis of organizations.

An interesting paradox surfaces when researchers attempt to understand the role of leadership within the broad context of organizational analysis. The paradox arises out of two somewhat opponent conceptions. There has been in recent years an increasing appreciation of the powerful influence of external forces in shaping organizational forms and processes (Aldrich, 1979; Pfeffer & Salancik, 1978). The basic notion is that organizations and their managements are inherently dependent on the environments in which they operate. In this vein, researchers have treated variations in organizational performance as being largely functions of environmental forces, which are viewed as unrelenting and often intractable external pressures and constraints. These external control models of organizations quite naturally raise questions about the relative importance of leaders and leadership factors to the functioning of firms; more or less implicitly, these views diminish the traditional significance that has been accorded to leadership as a direct, instrumental force shaping organizational outcomes. It is interesting to note that external control models first appeared at the same time that other organizational researchers, operating within a narrower frame of reference, began expressing serious doubts about the concept of leadership itself and its significance as a relevant, informative topic of research (Calder, 1977; McCall & Lombardo, 1978). In fact, some went so far as to suggest a virtual moratorium on traditional research on leadership (Miner, 1975).

On the other hand, there is simply no escaping the fact that over the years the concept of leadership has become firmly entrenched in our collective

efforts to understand and improve organizations. Survey results indicate that academicians and practitioners alike agree that leadership is the most important topic of all within the realm of organizational behavior (Rahim, 1981). Stogdill's (1974) well-known *Handbook of Leadership* contains over 3,000 references on the topic, and Bass's (1981) revision of that volume contains well over 5,000 references. A search of the widely used *Social Science Citation Index* reveals over 3,000 entries under the single descriptor "leadership" in the period 1972 through 1983, for an average annual rate of about 250 scholarly studies and articles per year. The practitioner-oriented domain of business journals and magazines is replete with examples of the celebration and glorification of leaders and leadership. Each year, *Fortune* highlights its "U.S. Business Hall of Fame"; *Forbes* and a host of other publications have similar traditions. All of these indicators, as well as the enormous success of popular books like Peters and Austin's *A Passion for Excellence*, generally point to the importance this topic has achieved in our collective consciousness. Despite the misgivings, dissenting opinions, and questions about leadership and its traditional significance, it is easy to conclude that a rather intense commitment to and investment in the concept has developed over the years. Leadership appears to have been sanctified and to play a key role in our phenomenological construals of organized activities and their outcomes. This observation underlies what we refer to as the romanticized conception of leadership.

THE ROMANCE OF LEADERSHIP

Previous work has offered a general description of this view of leadership and its implications for organizational analysis (Meindl, Ehrlich, & Dukerich, 1985). To summarize, the romanticized conception of leadership denotes a strong belief—a faith—in the importance of leadership factors to the functioning and dysfunctioning of organized systems. It implies that leadership is the premier force in the scheme of organizational events and occurrences. It can be construed as an assumption, preconception, or bias that interested observers and participants bring to bear when they must find an intellectually compelling and emotionally satisfying comprehension of the causes, nature, and consequences of organizational activities. It is the way many prefer to cope and come to grips with the cognitive and moral complexities of understanding the myriad interactions among the causal forces that create and maintain organized activity—forces that are often unknowable and indeterminant, perhaps even objectionable. It reduces and translates these complexities into simple human terms that they can understand, live with, and communicate easily to others.

One way to begin to explore the validity and implications of these ideas is to focus on the causes and effects of attributions made by people explaining some organizationally relevant phenomenon. An important aspect of the process through which people extract the meaning of events is how they understand the underlying forces that cause events to occur (Cantor & Brown, 1981; Harre, 1981). This idea has in fact animated theorizing consistent with

the current analysis. Both Calder (1977) and Pfeffer (1977), in radical departures from traditional views, argued that leadership is best understood as a social inference. Construing leadership as an explanatory category and as the outcome of attributional and similar sense-making processes, they treated it as one of the ways in which people understand the causes of important organizational events and outcomes. In this perspective, leadership events like successions appear to be largely symbolic, conveying a sense of understanding and control over difficult problems that require explanation and responsive action (Gamson & Scotch, 1964; Pfeffer 1977; Pfeffer & Salancik, 1978; Salancik & Meindl, 1984). Our notions concerning the romanticization of leadership extend this attributional analysis by suggesting that as an explanatory concept leadership has assumed a special status—not merely a prosaic alternative that people dispassionately consider on an equal footing with other explanations, it has achieved a heroic, larger-than-life value.

THE PRESENT RESEARCH

The initial studies on the romanticized conception of leadership examined the pattern of causal attributions that resulted when observers faced the task of explaining various levels of a system's performance under conditions in which the true underlying causal structure was logically indeterminant (Meindl, Ehrlich, & Dukerich, 1985). The results revealed (1) a bias toward viewing leadership as causally dominant and (2) covariance between performance levels and both the significance observers attached to leadership and their interest in it. The present research attempted to explore further, within the domain of causal attribution, the nature and implications of this bias toward leadership.

Presumably, one of the key rationales behind the recent great interest in the attributional processes associated with organizational behavior in general (Lord & Smith, 1983) and leadership in particular (McElroy, 1982) is that people may react to similar outcomes very differently depending on the particular causal inferences they made regarding these outcomes (Daft & Weick, 1984; Mitchell, 1982). Ford (1985), for example, argued that decision makers' attributions of causality largely determine organizations' responses to downturns. The general argument is that the way in which something is explained in part determines reactions to it.¹ The means of production inform subsequent reactions to the end product—"why" and "how" affect "what." When organizational leaders try to manage the interpretations of important constituencies and stakeholders through the manipulation of retrospective, causal accounts,² the rationale that attributions affect subsequent evaluations of outcomes and reactions to them is certainly implicit. In

¹ For a review of attribution theory and research on this general point, see Kelley and Michela (1980).

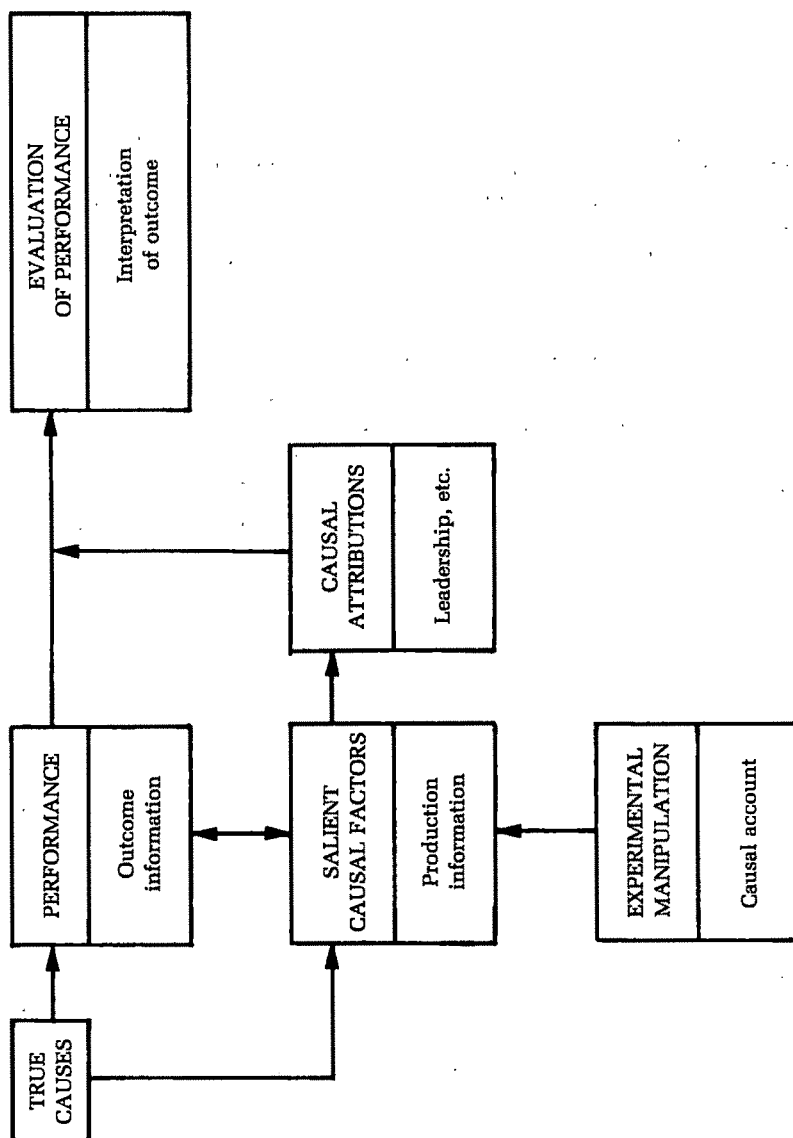
² "Causal accounting" does not here refer to financial accounting but rather to processes that occur within the general realm of social discourse in which the exchange of explanations and reasons for events and activities is important for behavior and maintenance of social order (Berger & Luckmann, 1966; Scott & Lyman, 1968; Semin & Manstead, 1983).

this vein, several recent studies have examined the attributions embedded within the causal accounts that occur in organizations' annual reports (Bettman & Weitz, 1983; Salancik & Meindl, 1984; Staw, McKechnie, & Puffer, 1983). These studies have all documented reasonably coherent attempts to portray an organization's fortunes and its management in self-serving ways. Bettman and Weitz and Staw and his colleagues found evidence of attributional patterns of self-enhancing and ego-defensive statements in which managers internalized and took credit for successes and externalized failures, disassociating them from managerial activities. Salancik and Meindl uncovered a pattern in which internalization of failure was under some circumstances as likely as internalization of success, reflecting attempts to suggest that outcomes were within—or at least potentially within—the control of management and not inevitably determined by uncontrollable external forces. Whatever the particular patterns, the fact that managements bother to engage in such activities suggests that causal inferences regarding performance are, for a variety of reasons, important to the actions of their constituencies.

For our purposes, the possibility that differences in causal interpretations can alter broad, subjective evaluations of events or outcomes provided some leverage for demonstrating the phenomenological value and significance invested in the concept of leadership. We reasoned that the degree to which a particular causal factor affected subsequent reactions to organizational events would to some extent reflect the intrinsic significance and value of that factor (Eagly, Wood, & Chaiken, 1981). If leadership is so critical to organizational success and failure, it is little wonder that it has achieved a high value. We explored the possibility that this value is powerful enough to influence the evaluations of outcomes to which it is attached and were particularly interested in demonstrating that varying the degrees to which performance outcomes can be credibly attributed to leadership would result in measurable differences in how judges evaluated those outcomes. Such an effect would provide rather strong evidence of the value that has been invested in the concept of leadership. It is well known that people tend to positively value causal factors associated with desirable effects—if for no other reason than their instrumentality as a means to an end. However, the transmission of value across a cause-effect linkage can also operate in reverse, so that in some special cases the desirability or value of a cause (or means) which is thought to produce an effect determines the value of that effect (or outcome). We are suggesting an instance of that special case: the value and significance ascribed to leadership as a causal force tends to enhance the subjective value of its presumed effects. The effect we were interested in was the performance of a firm. Given our premise regarding the romanticization of leadership, we expected judges faced with causal accounts attributing outcomes to leadership to evaluate those outcomes more favorably than when the same performance outcomes were attributed to factors not directly associated with leadership.

Figure 1 gives an overview of the working model we used to operationally define this hypothesis. Our logic was that the connection between quan-

FIGURE 1
Working Model



titative performance information and subsequent subjective evaluations of that information depend in part on judges' attributions concerning what produced the performance. Since causal attributions regarding performances are partially based on the relative salience of plausible causes, we chose to manipulate causal attributions by controlling the relative salience of factors implicating leadership. An ecologically valid way to deliver this manipulation was to embed relevant information regarding the production of outcomes within the context of causal accounts that retrospectively explained to judges how and why a pattern of performance was produced (Bettman & Weitz, 1983; Salancik & Meindl, 1984; Staw et al., 1983). The two experiments reported here both focused on different but closely related aspects of the working model outlined in Figure 1. The first attempted a direct test of our hypothesis, with the dependent variable of interest being judges' evaluations of performance. The second, using the same paradigm, attempted to find additional, albeit ancillary, less direct support for our hypothesis by focusing on the attributional process itself; its dependent variables were the nature and qualities of the attributions.

STUDY 1

Our research strategy was to confront graduate business students with the task of making subjective evaluations of quantitative, "bottom-line," business indicators. These data were presented in a context that made salient certain information, implicating particular forces as causally dominant in producing the performance outcomes. We manipulated the contextual information to create distinct and coherent themes, holding constant the generally positive performance data to which these themes were attached. We hypothesized that causal accounting themes highlighting the role of a firm's top management would result in better evaluations of performance than themes not directly linked to the qualities and activities of top management.

Methods

Subjects were 111 students enrolled in an evening M.B.A. program who volunteered to participate in this research. Their mean age was nearly 26 (25.90) years, and over 80 percent were fully employed. Each was randomly assigned to one of four experimental conditions.

Written instructions informed all subjects that the purpose of the questionnaire they were about to fill out was to examine the effectiveness of certain business and financial information in allowing people to form general impressions and evaluations of firms traded on the American Stock Exchange. The instructions went on to say that they would be asked to evaluate one firm on the basis of information that had been edited and condensed from several reputable business and investment reference sources. They then received an official-looking fact sheet that contained a general description of the firm and its business, a paragraph summarizing key operating strengths, and finally, a five-year summary of selected performance

indicators. These data included total sales, profit margins, net earnings, earnings per share, and stock price information for each year from 1978 to 1982. The content of the paragraph describing key operating strengths was manipulated to create four distinctly different causal accountings of the firm's performance in recent years: (1) The leadership version attributed the firm's performance to the top-level management team. (2) The employees version made attributions to the quality of the firm's specialized, professional bench scientists. Both of these versions made internal attributions, construing the firm's performance in terms of forces associated with characteristics of the firm, but the remaining two versions construed performance in terms of factors in the firm's external environment. (3) The market version provided an account that emphasized changing patterns of consumer needs and preferences. (4) The government version made attributions to changes in federal regulatory policies. All four accounts emphasized the favorable impact of the factors cited on the firm's competitive position and the uniqueness of that impact relative to the industry in general. These descriptions were not extensive; each was about 100 words long. The Appendix presents the four descriptions. We carefully developed these stimuli, not only to make them comprehensible and readable to participants, but also to insure that they would perceive the thematic differences in a manner consistent with our purposes. In a pretest, a small group of student judges ($N = 11$) were successfully able to sort the four fact sheets into their proper conditions without error or ambiguity.

After they had read the fact sheet, participants were asked to evaluate the firm's performance on two overall dimensions typically important to investors: profitability, with 0 = not at all profitable and 10 = very profitable, and risk, with 0 = not at all risky and 10 = very risky. In addition, participants rated the firm's performance on a series of nine bipolar, 11-point, semantic differential scales: 'good-bad, unstable-stable, successful-unsuccessful, risky-safe, positive-negative, variable-constant, profitable-unprofitable, uncertain-certain, and attractive-unattractive.

Results

Profitability and risk. We expected that those individuals who read the causal accounting theme emphasizing leadership would evaluate the firm's performance as more profitable and less risky than those who read the other three accounting themes. Table 1 summarizes data on evaluations of profitability and risk in the four conditions. We conducted a multivariate analysis of variance with profitability and risk as the dependent variables. Results indicated a significant multivariate effect ($F_{6,210} = 2.38, p = .03$). The univariate test for profitability was also significant, and the univariate test for risk was only marginally significant. Using planned comparisons, we tested our hypothesis more precisely; as predicted, the leadership theme produced a significantly more positive evaluation of profitability than the other three themes combined ($t_{107} = 3.17, p = .002$.) The same was true for the risk measure: the leadership theme produced lower evaluations of risk,

on average, than the remaining three themes combined ($t_{107} = 2.08, p = .04$). We combined high profit and low risk, reverse-coded, into a single overall measure of positive evaluation; as expected, the leadership theme produced a significantly more positive overall performance evaluation than the combination of the other three conditions ($t_{107} = 2.14, p < .05$), results that are very clearly consistent with our hypothesis.

Semantic differential measures. The nine semantic items were chosen a priori to reflect the two general dimensions of profitability and risk. However, factor analysis with varimax rotation revealed that all of the items loaded on a single overall dimension. Since factor loadings ranged from .51 to .84, we combined the entire set of nine semantic differential items into a single scale, positivity. A subsequent analysis of this scale revealed an acceptable level of interitem reliability ($\alpha = .88$). Corrected item-total correlations ranged from .46 to .81, so we retained all nine items. A one-way analysis of variance revealed that the various causal accounting themes significantly influenced subjects' evaluations of performance as measured on the positivity scale ($F_{3,104} = 2.76, p = .046$). Consistent with the hypothesis, a planned comparison revealed that subjects evaluated performance more favorably when it was accounted for in terms of leadership than in terms of the other three themes combined ($t_{104} = 2.52, p = .013$). Figure 1 presents a profile of ratings by condition.

In summary, the pattern of results obtained on both the main measures and on the positivity scale provided rather consistent evidence that a limited amount of qualitative information providing coherent themes accounting for a firm's performance can successfully influence subjective evaluations of that performance on a limited, quantitative subset of information. More important, the theme that accounted for high performance in terms of the

TABLE 1
Mean Evaluations
for Each Accounting Theme: Study 1

Measures ^b	Accounting Themes ^a				Univariate	
	Leadership	Employees	Market	Government	F^c	p
Profitability	8.00	7.31	7.07	7.07	3.62	<.01
Risk	5.71	5.15	4.43	4.96	2.10	<.10
Overall performance	6.86	6.23	5.75	6.02	4.87	<.001
Semantic differential scale	7.69	7.17	6.69	6.96	2.76	<.05

^a Numbers of subjects in each condition were: leadership, $N = 28$; employees, $N = 26$; market, $N = 30$; government, $N = 27$.

^b Response formats ranged from 0 to 10, with high scores indicating high profitability, highly favorable evaluation, and so forth. Risk was reverse-coded.

^c Degrees of freedom = 3, 107 except for the semantic differential scale, where they = 3, 104.

qualities and activities of top-level management enhanced evaluations of that performance relative to the alternative themes.

STUDY 2

This second experiment focused exclusively on the nature and causes of the attributions presumed to be operating in study 1. We sought to address three related issues. First, we wanted to shed more light on the processes through which the manipulated themes, particularly the leadership account, influenced evaluations of performance. One way to do this was to determine the underlying dimensions along which the causes emphasized in our accounts varied from one another. Weiner (1979) described three general dimensions along which people see many causal attributions as varying: internality, controllability, and stability. In terms of this research, internality refers to the extent to which the causal force implicated in an account emanates from inside versus outside the firm. Controllability refers to the firm's ability to exercise some degree of influence over the effects of a causal force on its outcomes or functioning. Stability refers to the general amount of change and variability that appears to be inherent in the causal forces being implicated. Ford (1985) presented a similar discussion of Weiner's dimensions within the context of organizational responses to downturns in performance. At least two of these dimensions are directly relevant to our analysis of leadership as a valued explanation for organizational events and occurrences. As a part of their discussion of the external control model of organizations, Pfeffer and Salancik (1978: 16–19, 262–268) addressed the significance of leadership variables for organizational functioning. They speculated that people attribute high levels of influence to leaders because they represent instantiations of personal causation that are clearly identified with a firm and appear to be more tractable than the impersonal, uncontrollable, and external forces existing in the firm's environment. Thus, we expected that subjects would rate the attributions generated by the leadership account as both internal and controllable. However, we deliberately included an alternative theme—the employee account—also implicating causal forces that subjects should also see as identified with the firm and controllable. In these terms, the leadership and employee accounts were very different from the market and government accounts, which alluded to environmental forces that would typically be considered less controllable. Thus, we expected to find major differences in how subjects evaluated the first and second two accounting themes, but could not clearly predict the relative stability of the causal forces implicated in the different accounts because they could all logically change or remain invariant, depending on circumstances. Nevertheless, we included stability in our analysis for the sake of completeness.

A second purpose was to assess the general effects and efficacy of the various causal accounts on subjects' subsequent attributions. Although developing the materials gave us some idea about their general effectiveness, study 2 let us explore this in some detail. We expected that the attributions that resulted in each condition would vary systematically in ways consistent

with our predictions. Most important, we expected that attributions to qualities and activities of top management would occur in the leadership-theme condition and that other attributions would emerge in the other three conditions.

Our third purpose was a preliminary exploration of the kinds of factors associated with people's general tendency to construe things in terms of leadership. We sought to determine the cognitive correlates of the subjects' tendency to make such attributions over and above what was attributable to our manipulation. Thus, we had judges rate the causes they felt each accounting theme implicated on a series of evaluative and descriptive dimensions and then compared these ratings with the strength of their attributions to leadership. These results indicated what the attributions to leadership implied about the underlying traits and attributes that we suspected were important; we hoped they would help us to understand more concretely the value and significance attached to leadership as an explanatory concept. The set of dimensions did not come from any particular conceptual system but was loosely constructed from our own thinking about what might be appropriate.

Methods

Subjects were 132 M.B.A. students similar to those in study 1. Their mean age was 24.15 years. Procedures were identical in every respect to those of study 1, except that instead of asking subjects to rate the firm's performance, we asked them to consider the nature and effects of the causal forces that probably accounted for the performance. There were three sets of dependent measures. One set asked them to rate, on 11-point scales, the degrees of internality, stability, and controllability associated with the causal factors implied by the various accounting themes.

A second set of measures asked participants to rate the causal factors emphasized in the various accounting themes in terms of the degree to which they implicated factors associated with chance, the qualities of top management, other firm characteristics not associated with top management, and the firm's environment. We expected that substantial differences would emerge regarding such attributions.

For the third dependent measure, subjects rated the various causal forces implied by each theme on 16 semantic differentials: good–bad, small–large, stable–unstable, plausible–implausible, powerful–weak, negative–positive, complex–simple, known–unknown, pervasive–narrow, defined–undefined, desirable–undesirable, temporary–permanent, numerous–few, related–unrelated, unique–common, and dependable–undependable. We included these measures to explore potential differences in the semantic meanings attached to the various themes and to perhaps reveal something about the general tendency to make leadership attributions. Finally, we gathered some background data, including age, gender, and number of finance courses completed.

Results

Causal dimensions. Table 2 summarizes data from a multivariate analysis of variance with type of theme as the independent variable and ratings of stability, internality, and controllability as the dependent variables. The multivariate test was significant ($F_{9,374} = 16.51, p < .001$). In addition, the univariate tests were significant for each of the dependent variables. We expected subjects exposed to the leadership and employee themes to see the accounts as implicating more internal factors than subjects exposed to the market and government themes would. A planned comparison with the first two conditions opposed to the second two verified this expectation ($t_{128} = 3.90, p < .001$). We also hypothesized that subjects would view causal accounts emphasizing leadership and employees as implicating more controllable factors than accounts that emphasized external factors. A second planned comparison along the same axes suggested that this was the case ($t_{128} = 6.22, p < .001$). Having no a priori expectations regarding the degree of stability implicated by the various themes, we computed Duncan's multiple range test. Interestingly, this post hoc procedure revealed that the leadership and employee themes were equally high in terms of stability ratings, and the market and government themes were equally low. Moreover, the leadership and the employee themes each elicited higher stability ratings than the other two themes.

Causal attributions. Data concerning subjects' causal attributions in each condition allowed us to assess the precise effects and efficacy of the manipulation used in study 1. We expected that the leadership theme would elicit many attributions to the quality and characteristics of the firm's top manage-

TABLE 2
Mean Ratings, Study 2

Dependent Variables	Accounting Themes ^b				Univariate F^c	p
	Leadership	Employees	Market	Government		
Causal dimensions						
Stability	6.77	7.06	5.18	5.71	5.54	<.001
Internality	6.78	6.55	2.26	3.29	36.50	<.001
Controllability	7.13	7.18	4.18	3.91	22.87	<.001
Causal attributions						
Chance/luck	3.65	3.30	6.09	5.00	11.23	<.001
Qualities of top management	7.84	6.96	6.50	6.62	3.06	<.001
Other characteristics of firm	6.16	7.09	5.00	5.53	6.36	<.001
Firm's environment	6.00	6.27	7.82	8.06	9.03	<.001
Leadership index	18.00	15.00	11.66	12.14	7.32	<.001

^a Response scales ranged from 0 to 10; high scores indicated greater attributions, degrees, and so forth.

^b Numbers of subjects in each condition were: leadership, $N = 31$; employees, $N = 33$; market, $N = 34$; and government, $N = 34$.

^c Degrees of freedom = 3,128.

ment and few to luck, environmental factors, and so on. The employee theme was to elicit attributions to characteristics identified with the firm but not with top management. We expected the market and government themes to elicit attributions to environmental characteristics and to be seen as indicating that fortune and circumstances were key to the firm's performance. Table 2 summarizes these data. We accomplished a preliminary omnibus analysis through a multivariate analysis of variance with condition as the independent variable and the four possible causal attributions as dependent factors. This analysis revealed a significant multivariate effect ($F_{12,371} = 7.47, p < .001$), and the univariate test for chance/luck was significant, as were the tests for qualities of top management, other characteristics of the firm, and the firm's environment. Planned comparisons across the four different accounting themes were generally in line with our expectations. Attributions to the quality and characteristics of top management were significantly higher, on average, in the leadership-theme condition than in the remaining three conditions combined ($t_{128} = 1.69, p = .014$). Attributions to other firm characteristics were greater, on average, for the employee theme than for the other three ($t_{128} = 4.80, p < .001$). Attributions to factors in the firm's external environment were significantly higher for the market and government themes than for the leadership and employee themes combined ($t_{128} = 3.61, p < .001$). Attributions to chance/luck followed the same pattern ($t_{128} = 4.14, p < .001$). All of these results attest to the efficacy of our manipulation.

Predicting the strength of leadership attributions. In order to use the semantic differential items to explore our subjects' general tendency to view leadership as causally important to performance, we first factor-analyzed these data to reduce their complexity and to identify any coherent underlying patterns. Principal component factoring with varimax rotation yielded a six-factor solution. Four factors had multiple items with strong loadings ($>.40$) and were coherent enough to label; four items, which we did not analyze further, either did not load high ($<.40$) on factors with other items or were the sole items composing a factor. Four subscales resulted, each containing 3 of the 16 possible items. We labeled these potency, reliability, certainty, and evaluation. Table 3 summarizes these scales and their psychometric properties. Consistent with the concept of the romanticization of leadership, we expected that the strength of attributions to leadership would correspond positively with judges' evaluations on these factors.

In order to capture the strength of each subject's tendency to view leadership as causally important, we combined responses to the four attribution questions. We formed a leadership index, similar to a measure employed previously (Meindl et al., 1985), by dividing attributions to top management by the sum of all other attributions and multiplying by 100. Conceptually, this index gives a reasonably clear estimate of the extent to which subjects preferred leadership to other ways of explaining and understanding the firm's level of performance. In effect, it assesses the strength of leadership attributions, controlling for individual differences associated with making attributions to all sources. A one-way analysis of variance revealed that this

TABLE 3
Four Subscales Derived from the
Semantic Differential Items for Study 2

Label	Alpha	Items
Potency	.70	Powerful-weak Large-small Plausible-implausible
Evaluation	.85	Good-bad Positive-negative Desirable-undesirable
Reliability	.76	Stable-unstable Dependable-undependable Permanent-temporary
Certainty	.70	Known-unknown Defined-undefined Related-unrelated

leadership index varied significantly by theme, and a planned comparison revealed that it was indeed highest for the leadership theme ($t_{128} = 3.97, p < .001$). Table 2 summarizes these data.

To examine the issue of main interest in this experiment—the strength of leadership attributions over and above that attributable to our manipulation of the accounting theme—we conducted a three-step hierarchical regression analysis. Tables 4 and 5 summarize the interrelations of the variables and the results. The first step entered appropriate dummy variables to control for conditions; the second step entered the background variables: age, gender, and number of completed finance courses. We included these data so that the estimates for the subscale variables, which were entered in the next step, would not reflect individual differences. In addition, we were curious as to empirical linkages between these variables and preference for leadership attributions, although it was difficult to form definite expectations for them. If anything, we expected that individuals with high exposure to finance courses and thus to a quantitative orientation toward the functioning of firms would put less stock in qualitative, interpretive accounts and be less likely to show systematic preferences for leadership attributions. But surprisingly, the preference for leadership attributions seemed stronger for those subjects. However, as a set, these background variables do not add much to the amount of variance explained.

In the final step, the four subscales derived from the semantic differential items were entered. As the tables show, the joint test of the entire third step revealed that this set of variables did add significantly to explaining variance in the strength of leadership attributions beyond that attributable to our experimental manipulation of accounting themes and to background variables. The reliability subscale was the single best predictor, showing a strong, positive correlation with the tendency to explain performance in terms of leadership.

DISCUSSION

Previous research on the romanticization of leadership has shown that people have a bias toward viewing leadership as a likely causal force when they account for organizational performance under ambiguous conditions in which true underlying causes are logically indeterminant (Meindl et al., 1985). That research also revealed that the strength of such preferences covaried with performance levels. The present research complements our earlier work; here, attributions to leadership were independent variables and

TABLE 4
Intercorrelations of Variables
in the Hierarchical Regression Analysis of Leadership Index, Study 2

Variables	Means	s.d.	1	2	3	4	5	6	7
1. Age	24.15	3.71							
2. Gender ^a	1.53	0.50	-.09						
3. Number of finance courses taken	0.50	1.13	.09	-.22**					
4. Potency	6.82	1.51	-.01	.15	-.08				
5. Evaluation	7.42	1.79	-.07	.23**	.15	.38***			
6. Reliability	6.05	2.12	.03	.17*	.19*	.33***	.56***		
7. Certainty	6.71	1.72	-.01	.12	.10	.57***	.34	.51***	
8. Leadership index	14.00	4.00	-.02	.04	.24**	.17*	.30**	.47**	.30**

^a Men = 1, women = 2.

* $p < .05$

** $p < .01$

*** $p < .001$

TABLE 5
Results of Hierarchical Regression
Analysis of Leadership Index, Study 2

Steps and Predictors	β	R^2	ΔR^2
1. Dummy variables for condition		.125***	
2. Background variables		.140***	.035
Age	-.034		
Gender	.089		
Finance	.191*		
3. Subscales ^a		.247***	.126***
Potency	.003		
Evaluation	.049		
Certainty	.152		
Reliability	.279**		

^a Subscales were coded so that higher values represent more potent, positive evaluation, certainty, and reliability.

* $p < .05$

** $p < .01$

*** $p < .001$

evaluations of performance level were dependent. In study 1, we deliberately manipulated attributions in order to observe their effects on subjective evaluations of performance; evaluations of outcomes attributed to leadership were significantly higher than evaluations of outcomes whose attributions did not implicate leadership, a pattern that fit our working assumptions about the value and significance attached to leadership as an explanatory concept. Apparently, this value is high enough to measurably alter the values ascribed to the outcomes it is seen as having produced.

Although it is difficult to specify how that value is transmitted, these results suggest that something akin to a powerful halo characterizes leadership as an explanatory concept, so that anything connected to or associated with the concept tends to take on similar value and significance. If this is true, we would expect to find effects similar to those observed in this research when examining evaluations of factors actors consider responsible for the production of leadership itself. Whether a similar effect would occur in evaluating poor performance is an open question since we investigated only positive performance. If a positive halo exists, people may see even obviously poor performance in a somewhat positive light if they attribute it to the efforts and activities of top management. But it is more likely that the halo is negative when people evaluate poor performance—when leadership appears to have produced poor outcomes, observers may view those outcomes in an exaggeratedly negative way. Our previous research found that the strength of leadership attributions was greatest when a system's performance was extremely positive or negative, with leadership factors credited for very good performances and blamed for very poor performances. Similarly, the halo effect observed in this study may be positive or negative, depending on whether the firm's performance impressed judges as generally good or as generally poor initially, before they considered causes. The result would be extreme, exaggerated evaluations of performance outcomes when accounts directly implicated leadership factors.

The effects we observed in study 1 occurred on two performance criteria roughly analogous to those typical of interest to investors—profitability, and to a lesser extent, risk. It is worth noting the results of a subsequent analysis that demonstrated a moderate positive correlation between high profitability and low risk. In fact, the strongest positive linkage between these two evaluations occurred for the subjects exposed to the leadership theme ($r = .40$ versus $r = .18, .30$, and $.04$ for the employees, market, and government themes, respectively). Apparently, subjects tended to view the effects of leadership on outcomes in a uniform and psychologically consistent way, and high profit and low risk are both congruent with the broader concept of positive performance. One hypothesis that follows is that judges will be rather dogmatic when evaluating the effects of a leader's activities across a series of different dependent criteria.

Study 2 was intended to specify the apparent value and significance attached to leadership as an explanation for the outcomes of organized activity. The focus was on the attributions themselves. Although the results

were hardly definitive, they provided some basis for speculation. The data on the cognitive correlates of the preference for using leadership as a way to understand a system's performance are particularly intriguing. The scales constructed from the semantic differential items—potency, evaluation, certainty, and reliability—tended to be positively associated with the strength of leadership attributions. In particular, reliability clearly covaried with leadership attributions. The most direct interpretation of these findings is that the high values attached to leadership factors result from these desirable characteristics, which people consider inherent in leadership. A second, more subtle interpretation relies on the premise that the causes of events and outcomes are not isolated but are often linked in causal chains of various lengths and complexities (Brickman, Ryan, & Wortman, 1975). Leadership's high value may be a function of judges' presuppositions regarding its location and effects in a chain of cause-effect linkages. The fact that leadership and other attributions occurred to some extent in all of the conditions is at least consistent with this notion and suggests that subjects in our research were sensitive to the noninterdependence of the various causal forces we attempted to manipulate. Thus, rather than being characteristics of leadership factors *per se*, the cognitive correlates we identified may in fact describe perceived characteristics of the effects produced by leadership factors. People may see leadership as the origin or initial force in a causal chain, ultimately affecting performance by virtue of its control of other causal forces more contiguous to outcomes. According to this interpretation, our results may indicate that judges assume leadership to have reliable and potent effects on factors with direct causal linkages to dependent performance variables. Further research may be able to separate the value ascribed to leadership owing to its presumed direct effects on outcomes and the value owing to presumed indirect effects. These represent aspects of causal schematas (Kelley & Michela, 1980) regarding organizational performances and as such may be aspects of actors' implicit leadership theories that researchers have yet to consider.

The aim of this research was to explore one implication of our working assumptions about the romance associated with leaders and leadership. Out of necessity, we conducted it under severely limited conditions. The hypothesis dictated the use of rather coarse and one-sided themes designed to elicit systematically different attributions from our judges. As the results of study 2 reveal, we were generally successful in doing that, at least for the relatively inexperienced individuals who participated in our research. It is safe to assume that such themes would never occur in real settings in these pure forms; real accounts, which are generated by managements with agendas very different from ours, tend to be much more complex and centered on different issues (Salancik & Meindl, 1984). Although most of our subjects held full-time positions in organizations and thus were not typical full-time undergraduates, they hardly represent the range of possible organizational constituencies and stakeholders. Future efforts might benefit from examining such processes in real, ongoing events and evaluations, using individu-

als and groups with both vested interests in veridical views of organizational functioning and some expertise in judging relevant cause-effect linkages in organized systems. Awareness of such issues should temper interpretation of our results.

The line of research on the romanticization of leadership of which this study is a part provides us with a glimpse of the power and prominence of leadership as a relevant, significant concept for comprehending complex organized systems. It may ultimately help us to understand what forces maintain such systems and how they accomplish social purposes. For example, the theory that these results support suggests a solution to a paradox inherent in the external control perspective on organizational functioning. Such a perspective not only diminishes the traditional significance of leadership, thereby representing the antithesis of the romanticized view, but highlights the symbolic role of management (Pfeffer, 1981; Pfeffer & Salancik, 1978)—leadership via the manipulation of symbols and the management of meaning. Although symbolic actions are most likely to occur when environmental, political, and other constraints make substantive actions infeasible, they can be highly effective in directing the activities of others, even when other avenues of influence and change are available (Peters, 1978). Several recent empirical studies have analyzed top managements' attempts to exert influence symbolically—through the causal interpretations they choose to make public in their annual reports to shareholders (Bettman & Weitz, 1983; Salancik & Meindl, 1984; Staw et al., 1983)—and each has documented reasonably coherent attributional patterns that are linked to general strategies of impression management. The primary purpose of these managerial causal accounts is to buttress faith in the efficacy of current administrations and to assert that the fate and fortunes of the firms are in good hands. Perhaps managers engage in these and other symbolic activities to enhance their firm's worth and to justify their own elite positions. However, we might reasonably ask why these thinly veiled attempts to persuade—likely products of obviously ulterior motives and agendas—are effective. How can such one-sided, biased interpretations of sometimes scant, sometimes contrary substantive effects be at all compelling—even to naive observers, let alone to sophisticated organizational constituencies who have stakes in such matters? Indeed, these causal accounts often appear to be prevarications involving the willing participation and receptivity of their intended targets. Given the results reported here, we suggest that the romanticized conception of leadership and the values and ideology it represents are likely to be important parts of this paradoxical receptivity.

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APPENDIX

The following paragraphs represent the causal accounts used in both studies reported in this article.

Leadership account. ACTRON's performance over the last few years is largely attributable to the outstanding leadership of Ross M. Pearson—Chief Executive Officer and Chairman of the Board—and his cadre of senior executives who took over the reins of the firm in 1979. The positive effects of leadership can be seen in several key strategic decisions to complete the development and bring to market a number of new pharmaceuticals—particularly a line of dietary drugs—that have since proven to be highly successful.

Employee account. ACTRON's performance over the last few years is largely attributable to the exceptional quality of the labor force it employs, particularly the fine new core of bench scientists—mostly biochemists and biochemical engineers—that came to the company and congealed into a productive group in 1979. The positive effects can be seen on a number of new and innovative product development efforts—particularly a line of dietary drugs—that have been brought to market and have since proven to be highly successful.

Market account. ACTRON's performance in the last few years is largely attributable to external changes in market demand that became apparent in 1979. These external changes in consumer demand have favored Actron's particular mix of products, which is somewhat unusual in the industry. The positive effects can be seen, for example, in a number of its dietary drugs. These drugs—most of which had been developed and patented years ago—have suddenly within the last few years become highly successful.

Government account. ACTRON's performance over the last few years is largely attributable to favorable changes in Federal drug regulatory policies that went into effect in 1979. The positive effects of these external changes on this firm's performance can be seen on a number of new pharmaceuticals—particularly a line of dietary drugs—that had been held up and restricted for some time. Deregulation in this specific area has fortuitously coincided with Actron's product development efforts—which have been atypical for the industry—allowing it to complete testing of new drugs and bring many of them to market. The new dietary drugs that have emerged from this situation have since proven to be highly successful.

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EARLY INTRAORGANIZATIONAL MOBILITY: PATTERNS AND INFLUENCES

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This study examined patterns of early upward mobility for a cohort of 180 employees of an oil company over an 11-year period. The results were not consistent with a strict tournament model of mobility. Later positions were more predictive of career attainment than were early promotions. In addition, initial functional area and the number of different jobs held were related to career attainment. The data supported signaling theory as an explanation of the effects of historical data on decisions about promotions.

According to previous research, the earliest stage of an organizational career is critical. Hall's (1976) model of career stages describes an establishment/advancement stage preceding a maintenance or plateau stage. Research on early careers has focused on the positive effects of first job experiences (Berlew & Hall, 1966; Bray, Campbell, & Grant, 1974) and the advantages of a pattern of early promotion (Rosenbaum, 1979; Veiga, 1983). The research on the topic implies that unless an individual has a good, challenging first job and receives quick, early promotions, the entire career will suffer. This view has been generally accepted for over 20 years (Schein, 1964).

The strongest evidence for the effects of early promotions comes from the research of Rosenbaum (1979, 1984) and his tournament model of mobility. He found that those who were promoted early rose to higher levels than those who were not. The first group remained in the "tournament," but those not promoted in the early rounds were effectively eliminated from later competition. Rosenbaum's research is the only such longitudinal study of intraorganizational mobility patterns of which I am aware. This study reexamined the importance of early promotions in a new setting and also tested for the effects of other signals (Rosenbaum, 1984) on career attainment within a firm.

THE TOURNAMENT MOBILITY MODEL

Rosenbaum (1979, 1984) developed the tournament mobility model as a compromise between two earlier concepts, contest mobility and sponsored mobility (Turner, 1960), both of which described student's careers in the educational system. Contest mobility implies that all have an equal chance

The author gratefully acknowledges the research assistance of Daniel Talarcek, the support of the Mellen Foundation, and the very constructive comments of three anonymous reviewers.

to compete for further advancement, regardless of their early tracks. Sponsored mobility implies selection of winners very early—even before a competition starts. In a tournament, however, everyone has an equal chance in the early contests, but the losers are not eligible for later contests, at least not those of the major tournament.

Another closely related issue that Rosenbaum addressed is whether historical or ahistorical models best describe career paths and chances for mobility. Markov models (Mayer, 1972; Vroom & MacCrimmon, 1968) are ahistorical in that they assume that individuals' chances of moving to new positions are a function of their current states or positions, not of the entire sequence of their careers. Kelley (1973), in a study of occupational attainment, found that status at various points in the life cycle depended mainly on occupational status in the preceding period. Earlier positions only indirectly affected current status: "past failures are forgiven, and past successes are forgotten" (Kelley, 1973: 492). However, the tournament model and the studies of early job experiences stress the importance of early positions, thus affirming a historical or path-dependent model.

Because Rosenbaum rigorously documented the tournament mobility pattern in only one firm, and because situational contingency factors have important effects on mobility patterns (Anderson, Milkovich, & Tsui, 1981), a review of the setting, methodology, and results of Rosenbaum's (1979, 1984) research will facilitate comparisons with the present study. Rosenbaum obtained data supporting the tournament mobility model from an "old, well-established, autonomous, investor-owned firm, having offices in many cities and towns across a large geographic region" (1984: 4). The firm employed between 10,000 and 15,000 persons during the period studied, 1962–75. Aggregate rates of promotion for the corporation tended to correspond to its growth patterns during this time. Neither report provides further information on the firm; however, the large number of foremen in the sample suggests a labor-intensive manufacturing operation.

Focusing on movement through the five lowest levels of the firm, Rosenbaum (1979) analyzed personnel data for 671 employees who entered the firm between 1960 and 1962 and remained through 1975. The results indicated that those promoted in the first period were much more likely to receive further promotions and reach higher levels than those who were not promoted early. In fact, only those promoted in the earliest period were able to reach middle management within 13 years.

In his more recent analysis of the same cohort, Rosenbaum (1984) used a different measure of career attainment, utilizing the firm's job status classifications that reflected the demands and requirements of each job within each level. Both individual attributes and early job status predicted later job status. In addition, job status in 1962 had an effect on status attained by 1975 that was independent of intervening (1965) status attainment, thus supporting a path-dependent historical model.

CHALLENGES TO THE IMPORTANCE OF EARLY SUCCESS

Recent research has questioned the effect of a challenging first job. Taylor (1981) conducted a laboratory study in which subjects performed a variety of tasks, such as puzzles and memory exercises. The challenge of their first job assignment had less effect on performance standards, attitudes, and perceptions of competence than did later job challenge. In addition, a study by Williams and Van Sell (1985) sampled over 2,000 employees of hundreds of business, non-profit, and educational organizations. In this study, good, challenging first jobs were negatively associated with self-reports of career advancement as measured by numbers of promotions, jobs, functional areas, and organizations, all statistically controlled for numbers of years worked.

Investigators have identified problems in measuring career progression as well. For example, numerous promotions and interorganizational moves do not necessarily represent upward mobility for they may actually be lateral moves (Cawsey, Nicholson, & Alban-Metcalf, 1985; Stewart & Gudykunst, 1982). Veiga (1983) found time spent in a first position within a firm to be strongly related to average time per position later in a career, which again seems to imply that early experience and quick movement lead to later success. However, he recently (1985) showed that a very rapid rate of movement is associated with lateral moves and transfers and that managers from different functional areas move at different rates. Managers on a slow track move less frequently, but they reach the same hierarchical level as those on the fast track by taking larger steps.

THEORETICAL FRAMEWORK

Why do early career experiences have lasting effects on careers, if indeed they do? Researchers have proposed two general explanations: (1) early experiences condition an individual to expect challenging assignments and reinforce early success, which leads to more challenge, more success, and rapid promotion and recognition (Berlew & Hall, 1966), and (2) a pattern of early success and promotion serves as a signal to decision makers that an individual has the potential and experience needed for further promotion (Rosenbaum, 1984). It is possible that both explanations are valid; however, this research investigated only the second.

Signaling Theory

Rosenbaum suggested signaling theory (Spence, 1973) as an explanation of the tournament pattern of mobility. Early movement is critical for later promotion because, in the absence of more objective criteria, decision makers will rely on current job status in relation to age or tenure as a signal of ability.

Despite models prescribing how to improve the process (Stumpf & London, 1981), those who make decisions about promotions often work with subjective information and operate under bounded rationality (March & Simon, 1958). Modern human resource information systems and skills

inventories will never completely replace personal contacts as a key factor in decisions concerning selection or promotion. Decision makers often conduct a limited sequential search for acceptable candidates for a position, first considering familiar candidates and those who have had experience similar to that required (Campbell, Dunnette, Lawler, & Weick, 1970). A high level in an organization and an impressive track record contribute to an employee's familiarity to decision makers, increase the individual's managerial experience, and promote an image of high potential. Kanter (1977) discussed the importance of such visibility in one large corporation.

This theory also facilitates the identification of other possible signals. A second variable that may act as a signal affecting chances for promotion within organizations is the functional background of an employee. Several studies have noted that firms in certain industries tend to choose their chief executives from particular functional areas (Piercy & Forbes, 1981). Pfeffer (1981) developed a model of executive succession in which different functional areas gain power as the result of their abilities to deal with critical environmental issues. Investigating a lower level, Vardi and Hammer (1977) showed that the type of job technology—long-linked, mediating, or intensive—used by rank-and-file workers within a plant affected chances for mobility. In a comparison of managers drawn from three similar major manufacturing firms, Veiga (1985) found that career patterns were related to functional area. The fast-track managers, who moved frequently, but often laterally, were likely to be from areas representing mediating technologies like marketing and personnel, and the slow-track managers, who moved less frequently but more often vertically, were likely to be from intensive technologies like R&D or engineering. Finally, Slocum, Cron, Hansen, and Rawlings (1985) hypothesized that a firm's business strategy would affect opportunities for promotion for different functions. They found that in a defender firm, in which financial and production issues were more critical than growth and new products, there were more plateaued sales people than in an analyzer firm. Therefore, it is reasonable to expect that within any firm, at a given time, individuals in different functions face different career paths. These differences may be related to such factors as business strategy, environmental uncertainty, and type of industry.

A third factor that may serve as a signal is the number of different jobs held. Kanter (1977) has described this as a factor predicting chances of promotion. This may be because those who make decisions about promotions see a breadth of knowledge of different areas as a prerequisite for higher levels of responsibility, or it may be that having held multiple jobs merely increases an individual's visibility within a firm.

HYPOTHESES

Signaling theory suggests three cues that those making decisions about promotions may use: (1) prior history of promotions, (2) functional area background, and (3) number of different jobs held. Using these three types of signals as a framework, I structured hypotheses for this research, examining

initially the first signal to identify the degree to which early promotions have lasting effects. Finding such lasting effects in a new research setting would support a historical, path-dependent, tournament model. On the other hand, if recent positions proved to be the best predictors of success, results would support an ahistorical, path-independent model.

The strict tournament model implies that employees place out of major organizational tournaments when they fail in very early contests, and consequently they have little or no chance to be as successful as those who win the early contests. No data will fit this ideal model perfectly. However, modified models of sports competition may better fit the organizational promotion process. They suggest three different sets of rules, varying with respect to the effects of early success:

1. Single elimination tournament—only those who win early contests are eligible to compete for the highest positions.
2. Round robin tournament—an early record of winning counts, but the major predictor of success is later competition—one loss does not necessarily mean elimination.
3. Horse race—early success may give a candidate a head start, but there are no extra points for an early lead. Later position is the best predictor of success.

Three hypotheses correspond to these rules.

Hypothesis 1: All those who reach the highest levels in a tournament will have won in the early contest.

Hypothesis 2: Recent position will best predict final attainment, but early position will add significantly to the variance accounted for.

Hypothesis 3: Later position will best predict final attainment and early position will not add to the variance accounted for.

The first of these three hypotheses concerning the effects of prior promotions states the theory of the tournament mobility model, the second proposes a less strict form of path dependence, and the third implies path independence in employees' careers.

In framing hypotheses concerning the two other types of signals that may affect decisions on promotions—functional area background and number of jobs held—I paid close attention to the research setting, because the role and nature of signals will vary with organizational characteristics. The data for this study were gathered from a firm in the oil and gas industry. Any firm competing in this industry in the 1970s was very much dependent on its technical experts. Critical competitive issues included the highly uncertain activity of exploration for new resources as well as complex problems of production, transportation, and processing. In addition, on the assumption that oil prices would remain high, this firm and many others were experimenting with products such as synthetic fuels and engaging in much basic research and development. Therefore, I hypothesized that a technical back-

ground would signal greater value to the firm and therefore be related to greater career attainment in this firm during this period.

Hypothesis 4: Final level of career attainment will be positively related to having initially held a position with a technical function.

The ideal candidate for promotion would have a technical background, but also experience in other areas.

Hypothesis 5: Final level of career attainment will be positively related to the number of different jobs held.

Finally, each of these signals provides unique information. Therefore,

Hypothesis 6: Early career attainment, initial technical function, and the number of different jobs held will each contribute significantly to the prediction of final career attainment.

METHODS

Setting

A large domestic oil company with personnel widely dispersed across the United States served as the research setting. The economic conditions within this industry and the financial position of this particular firm improved dramatically during the 1970s, the period of the study. During this period, the firm also underwent a major transition in which an earlier emphasis on the processing and regional marketing of petroleum products gave way to a new emphasis on producing, transporting, and distributing crude oil. It was also actively exploring alternative energy sources. The number of employees remained relatively constant—about 22,000—during the period, and there were no major changes in personnel or management development policies. However, toward the end of the period, the firm began recruiting and hiring more managers and technical personnel from outside in anticipation of future growth. Other oil companies were also recruiting very aggressively at this time.

Data Collection and Population

The data were obtained from the firm's computerized payroll records system during my faculty internship with the firm. This system contained every employee's complete job and salary grade history. Since the study focused on early upward intraorganizational movement into managerial positions, I conducted a search for all exempt, or salaried, employees still with the firm in 1981 who had been hired into entry-level, non-management positions in 1968, 1969, or 1970. Some typical entry-level jobs were accounting analyst, field auditor, sales trainee, junior engineer, junior chemist, programmer, and staff assistant. These criteria were met in 180 cases. Demographic data like age, gender, and education were not available.

Measures

The company's very detailed systems for job classification and salary grades were the primary data. Classification codes fell into three general categories, which I used to identify initial job functions: (1) technical/professional—engineers and scientists; (2) administrative—administrators, accountants, sales/marketing personnel, computer specialists; and (3) other—lab technicians, clerks, administrative assistants, customer representatives, draftsmen, and so forth.

Examining the list of each employee's job codes provided the number of different jobs each had held. I counted only a change in functional area or level of responsibility as a different job. For example, moving from chemist to senior chemist did not count as a job change, although it would result in a higher salary grade; moving from chemist to personnel analyst or to manager, chemical analysis did count as a job change.

The actual salary grades served as one measure of career attainment. Company job analysts determined these grades, which were similar to Hay system grades and also to the measure of job status used in Rosenbaum's (1984) study. They reflected the worth of the employee's contribution to the company. As in many technologically oriented firms, there were some technical specialists with high salary grades who did not manage large groups of people. However, their grades did reflect their status, salary, and career achievement. I measured career attainment in terms of salary grade yearly, using the highest grade achieved during a calendar year.

Rosenbaum's early report (1979) used only management level to measure career attainment. To facilitate comparisons with that study, I created a second measure, grouping the salary grades into five divisions corresponding to levels in the organization. These ranged from nonmanagement to upper-middle management, immediately below the vice-presidential level. Promotions were defined as movements from one level to another.

Two further differences between Rosenbaum's earlier study and the present one existed. Data were available for every year in this study, not merely for three- to four-year intervals as in the earlier research. Finally, Rosenbaum identified movements by calendar year. However, since his group included employees hired in 1960, 1961, and 1962, those promoted in a given calendar year—1965, for example—may have had from three to five years tenure with the firm. Therefore, I identified movements in terms of years with the firm, not calendar year.

RESULTS

Analysis by Level

Comparing this study's data on movement through the general levels of the organizational hierarchy and Rosenbaum's (1979) data required that competition periods be defined. Because such division is necessarily somewhat arbitrary, I followed his choice of three- to four-year periods, which allowed the time span to be divided into three portions.

Examining the actual pattern of promotions confirmed that natural breakpoints occurred at three- to four-year intervals. Inspection of a career tree for the cohort indicated that the firm promoted seven employees one level within their first four years. No one received another promotion until year 5. Furthermore, in years 5, 6, and 7, six employees were promoted to the second level of management, then none were promoted farther until year 8. Therefore, I defined years 1 through 4 as the first competition period and years 5 through 7 as the second competition period.

Table 1 compares the final levels attained with levels attained by year 4. There is a significant relationship between winning the first contest—reaching lower management by year 4—and reaching a high position by year 11. However, these winners were by no means the only ones to reach higher levels of management—11 employees who did not receive early promotion still reached middle- and upper-middle management.

As Table 2 shows, position after the second period, in year 7, is more strongly related to final attainment than is position at the end of the first period. However, even here, four employees reached middle- and upper-middle management by year 11 who were still in nonmanagement positions as late as year 7. Therefore, results did not support Hypothesis 1, positing a strict tournament model. Early promotion is not an absolute prerequisite for later success, although it does improve an individual's chances.

Level of attainment was also related to initial job classification. Table 3 shows that those who entered the firm in technical positions were very highly represented in management by year 11 and contributed the highest proportions of managers at all levels. In fact, by year 11, 78 percent of the technical entrants were in management positions, in comparison to 41 percent of those who started in administrative positions and 21 percent of those from other entry positions. These data strongly support Hypothesis 4.

Unrelated to any hypothesis, an interesting interaction between entry position and competition periods occurred. After the first competition period, six of the seven early promotions to lower management were from administrative positions. Following the second period, there was no significant relationship between entry position and level attained. However, as Table 3 shows, by year 11 technical employees were way ahead, perhaps indicating that the timing of significant promotions differs depending on functional background.

Analysis by Salary Grade

Studying salary grades allowed a more detailed analysis of movement. The intercorrelation matrix shown in Table 4 employs a dummy variable for technical entry position (1 = technical, 0 = nontechnical) and a dummy variable for administrative entry position (1 = administrative, 0 = nonadministrative). All correlations among years are significant, again indicating that early position does make a difference. However, salary grades in years 1, 2, or 3 account for less than 10 percent of the variance in grades in year 11. As might be expected, the highest correlations are between adjacent years. In

TABLE 1
Cross Tabulation of Levels at End of First Competition Period
with Final Levels^a

End of First Period—Year 4	Final Levels—Year 11				Totals
	Nonmanagement	Lower Management	Lower-middle Management	Middle Management	Upper-middle Management
Nonmanagement	96	45	21	8	3
Lower management	0	3	2	1	1
Totals	96	48	23	9	4

^a Kendall's $\tau_c = .096, p < .001$.

TABLE 2
Cross Tabulation of Levels at End of Second Competition Period
with Final Levels^a

End of Second Period—Year 7	Final Levels—Year 11				Totals
	Nonmanagement	Lower Management	Lower-middle Management	Middle Management	Upper-middle Management
Nonmanagement	95	34	9	3	1
Lower management	1	13	11	6	1
Lower-middle management	0	1	3	0	2
Totals	96	48	23	9	4

^a Kendall's $\tau_c = .385, p < .0001$.

TABLE 3
Cross Tabulation of Initial Job Categories with Final Levels^a

Job Categories	Final Levels—Year 11						Totals
	Nonmanagement	Lower Management	Lower-middle Management	Middle Management	Upper-middle Management		
Administrative	37	17	6	3	0		63
Technical	13	26	12	4	4		59
Other	46	5	5	2	0		58
Totals	96	48	23	9	4		180

^a $\chi^2 = 45.11$, $df = 8$, $p < .0001$.

TABLE 4
Basic Statistics and Intercorrelations Among Salary Grade Levels
by Year, Entry Function, and Internal Movement^a

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Year 1	9.86	1.42													
2. Year 2	10.43	1.35	77												
3. Year 3	11.57	3.94	41	46											
4. Year 4	12.24	4.74	40	41	83										
5. Year 5	13.61	6.63	34	33	64	73									
6. Year 6	14.82	7.71	31	33	53	62	86								
7. Year 7	17.19	9.96	26	28	46	53	71	82							
8. Year 8	18.98	11.39	28	29	40	48	64	73	88						
9. Year 9	21.50	12.81	30	27	33	42	55	63	76	87					
10. Year 10	24.14	14.01	28	30	30	39	52	59	69	79	88				
11. Year 11	26.26	15.67	26	26	28	39	48	54	64	74	82	92			
12. Technical entry	—	—	24	18	-04	-02	10	17	21	23	37	40	44		
13. Administrative entry	—	—	30	24	28	26	14	11	02	01	-06	-10	-11	-51	
14. Number of different jobs	3.72	1.85	-10	-03	09	12	22	30	43	46	45	45	50	-03	-01

^a Decimal points are omitted; $N = 180$; correlations of 13 or higher are significant ($p < .05$).

addition, correlations among later years are consistently higher than those among the earlier years, a pattern likely in any contest where all start in approximately the same position but spread out over time. Clearly, later grade levels predict final success in terms of salary much better than early grade levels.

This table also illustrates the interactions between type of entry position and time. Positive correlations exist between a technical entry position and grade in years 1 and 2 and in years 6 through 11, but not with grade in years 3, 4, and 5. Administrative entry position correlates with salary grade in years 1 through 5, but not in years 6 through 11. This indicates that either of these entry points provides an initial advantage. Furthermore, administrative employees are likely to maintain their advantage through year 5. Technical employees lose their advantage following year 2, but regain it from year 6 on. This pattern again suggests that different career patterns exist for administrative and technical managers.

The data describe the careers of only those who stayed with the firm through the entire period. Different patterns of retention might also explain the advantage of a technical background; perhaps superior technical personnel stayed with the firm, and superior administrative personnel left. Such movement, which would contribute to different patterns of promotion for the two functions, could result from employees' awareness of differences between internal and external opportunities. However, the data were not readily available to test these possibilities.

Finally, the number of different jobs held does not make any difference in the early years, but is related to attainment in years 5 through 11. It does not correlate with entry in either a technical or an administrative position. The simple correlations support Hypotheses 4 and 5.

Multivariate Analyses

Hypotheses 2 and 3 were tested by means of a hierarchical regression analysis to determine whether adding early attainments to the regression model would improve predictions based on later attainment. Numerous combinations of early and later years were possible; however, to be consistent with the conventions adopted initially, I chose year 7, the end of the second competition period, as the later year and year 4, the end of the first competition period, as the early year. Year 4 did not add significantly to the variance accounted for ($F_{1,177} = 0.859$). In fact, no early year added significantly to predictions based on attainment by year 7. The contribution of year 1 ($F_{1,177} = 3.039$) was closest to significance. Collinearity among years, which tends to result in high variance estimates for the regression weights and increases the probability of a Type II error (Belsley, Kuh, & Welsch, 1980), hampered finding statistically significant support for Hypothesis 2. Although the existing data do not support Hypothesis 2, they are consistent with Hypothesis 3, which supports the ahistorical model of path independence.

These analyses established that later attainment, by year 7, predicted final career attainment better than did early attainment, by year 4. For a strong test of Hypothesis 6, I investigated whether technical function and job mobility would add significantly to the already appreciable relationship between years 7 and 11.

By year 7, defined as the end of the second competition period, 38 employees had received at least one promotion (Table 2), but none had yet moved above lower-middle management. After year 7, small numbers of managers started to reach the highest levels attained during the study. Therefore, year 7 appears to be the year before the final competition begins. I computed a forward stepwise regression, entering year 7 first and entering the other two variables in the order of their contributions to additional variance. The results, shown in Table 5, indicate that all three variables—past attainment, initial function, and number of different jobs—contribute uniquely to the prediction of final career attainment.

The data indicate support for a historical model of career attainment, but one that differs from Rosenbaum's. In the correlation matrix (Table 4), attainment in year 7 was related to early levels of attainment, technical entry position, and number of different jobs held. However, in the hierarchical regression analysis, early levels added nothing to prediction of success in year 11 based on year 7. Early success may have contributed to levels reached by year 7, but later decision makers forgot such success. Entry in a technical position and the number of different jobs held, both of which contributed to prediction of year 7 attainment, also added to predictions of final attainment above and beyond the contribution of year 7 itself. It seems that decision makers remembered these types of historical information.

DISCUSSION

The results reported here offer weak support for the tournament model of career mobility. Although early promotions were related to later attainment, strict tournament rules were not in force, because the losers—those passed over in the early periods—were later able to move up quickly. In addition, the

TABLE 5
Hierarchical Regression Analysis of Salary Grade
in Year 11 on Three Variables

Independent Variables	Step 1		Step 2		Step 3	
	<i>b</i>	<i>s.e.</i>	<i>b</i>	<i>s.e.</i>	<i>b</i>	<i>s.e.</i>
Salary grade in year 7	1.015	0.090	0.911	0.085	0.676	0.086
Technical entry position			10.509	1.789	11.916	1.645
Number of different jobs					2.772	0.453
R ²		.416		.511		.597
Incremental R ²		.416		.095		.086
F _{1,176}		181.64*		41.62*		37.46*

* $p < .001$

data do not support a concept of historical path dependence in which entire career patterns are critical. When attainment at the end of the second period of competition was used as the basis for the prediction of final career attainment, attainment after the first stage of competition added nothing to predictions. The results were more analogous to a horse race than to a tournament: position out of the gate had relatively little effect in comparison to position entering the home stretch.

Different mobility patterns for administrative and technical personnel may in part explain why the pattern of the early years did not always persist. Those who started in administrative positions began to move up early, but also plateaued early. A technical background meant a longer wait before upward movement, followed by relatively rapid promotion. The number of different positions held also predicted higher attainment, as noted previously by Kanter (1977). This factor may increase candidates' visibility or increase their breadth of knowledge about an organization.

Past position, functional background, and number of different jobs all seem to act as signals to those making decisions about promotions. These signals were all strongly related to career attainment, together accounting for 60 percent of the variance.

Both Rosenbaum's (1979, 1984) research and this study used data from single firms, and both studies demonstrated the effects of historical events on later promotions, although different patterns emerged. What generalizations can be made? Examining the settings shows that Rosenbaum found a strict tournament form of mobility in an old, well-established firm, probably in manufacturing, which experienced very rapid growth in the middle of the period studied. In this study, patterns of delayed promotion, with an emphasis on technical background, emerged in a long-established firm in the energy industry that was undergoing a major change in business strategy and experiencing rapid growth in earnings toward the end of the period studied.

The different patterns may simply be attributable to the differing economic fortunes the two firms experienced during the course of the studies (Anderson et al., 1981). Better economic conditions lead to growth, which leads to promotions. Alternatively, it is possible that these differences relate to organizational contingency theory (Lawrence & Lorsch, 1969; Woodward, 1965). In a stable, predictable environment, a structured career pattern, in which early promotions have lasting effects, is likely. The early job challenge studies at AT&T also describe careers within a very stable environment (Berlew & Hall, 1966; Bray, Campbell, & Grant, 1974). In an industry with a more unpredictable environment, a process production technology, and an orientation toward long periods of time, a less structured, slower pattern of promotions might be likely. This second type of pattern, slow promotion and evaluation and many different jobs, resembles the type Z career paths identified by Ouchi (1981). It is similar to Japanese practice, but differs from the traditional American practice of rapid evaluation and promotion within specialized functional areas.

The different patterns found for those entering into different functional areas may also relate to organizational contingency theory. Pfeffer (1981) proposed a mechanism by which organizations adapt to their environments. The changes occur as a result of executive succession, which in turn is influenced by the relative power of various functional areas. Functional areas gain power if they possess the skills needed to deal with critical environmental demands. In the firm studied here, technical expertise was certainly related to the most critical tasks: exploration, production, processing, distribution, and research and development. Nontechnical administrative skills seem to have been less critical. Slocum and his colleagues (1985) similarly reported finding that sales personnel were more likely to be plateaued when they worked in a firm in which financial and production issues were more critical than growth and new products.

The pattern of slower promotion for technical personnel may apply beyond this industry and firm. Veiga's (1985) data on managers in manufacturing firms showed that slower rates of movement were associated with what he called intensive technology—activities like R&D and engineering. Perhaps it takes longer to evaluate the managerial potential of technical personnel, or perhaps their skills are too valuable to lose by early promotions into managerial positions.

In summary, results did not strongly support the tournament mobility model in which early promotions have lasting effects on career attainment. Instead, there was support for an alternative historical model using past position, career movement, and functional background as signals to those who make decisions about promotions. However, I did not study the actual decision making process, but only its results. More detailed research on decisions about promotions is needed (Stumpf & London, 1981). Obviously, attempts to generalize from the present results, which describe only one firm and one cohort during one particular time span, must be cautious. Future research on career patterns should study multiple cohorts (Stewman & Konda, 1983) under differing economic conditions. In addition, further research is needed to explain better the main and interaction effects of such variables as environment, technology, business strategy, and functional background on career patterns.

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RESEARCH NOTES

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1987, Vol. 30, No. 1, 126-138.

ORGANIZATIONAL DYSFUNCTIONS OF DECLINE

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In the last decade, the literature on decline has grown exponentially. Beginning with projections of impending shortages and reductions in the early 1970s (Bogue, 1972; Boulding, 1975; Cheit, 1973; Hirschman, 1970), decline has become an important focus of writing in organizational and management theory (Hirschorn, 1983; Levine, Rubin, & Wolohojian, 1981; Whetten, 1980). About 70 percent of the literature on decline has been produced since 1978 (Zammuto, 1983).

There is an emerging consensus in this literature that a variety of dysfunctional organizational attributes are associated with conditions of decline. Investigators have discussed these attributes at the individual level of analysis (Staw, Sandelands, & Dutton, 1981), the group level (Krantz, 1985), and the organizational level (Whetten, 1981). Increases in conflict, secrecy, scapegoating, self-protective behaviors, rigidity, and turnover and decreases in morale, innovativeness, participation, and long-term planning are among the common problems associated with periods of decline. However, to date no one has conducted a multiorganizational, empirical investigation to substantiate these claims. The large majority of published studies on this subject are theoretical treatises, proposed frameworks, descriptions of the experiences of single organizations or individuals, or analyses of demographic trends. Large scale studies of multiple organizations experiencing decline are nonexistent.

This study investigated the presence of dysfunctional attributes during periods of decline. We intended to fill the void in this literature by examining the extent to which certain negative organizational attributes characterize decline. Before researchers can legitimately identify valid prescriptions for

Financial support for this project was provided by the National Institute of Education, and the Graduate School of Business Administration and the Center for Study of Higher and Postsecondary Education at the University of Michigan.

managing decline, empirical research must determine whether organizations really do encounter special problems during or after periods of decline.¹

DYSFUNCTIONS ASSOCIATED WITH DECLINE

Scholars have linked at least 12 dysfunctional attributes to decline in organizations. The logic for these linkages and a brief review of relevant references follow.

Decline, by definition, involves restricted resources and pressures to cut back. Hermann (1963), Hirschman (1970), Levine (1978, 1979) and others have noted the intensification of *conflict* under such circumstances. In times of abundance, organizations can meet most legitimate demands for resources, but with scarcity, conflicts arising from mutually exclusive resource requirements predominate. A need to retrench or cut back is also associated with *across-the-board* cuts more than with prioritized cuts, as attempts to ameliorate conflicts occur (Boulding, 1975; Cameron, 1983; Cyert, 1978).

Scarcity-induced conflict also often takes the form of increased *pluralism*, or the emergence of many organized and vocal interest groups (Pfeffer, 1981; Pfeffer & Salancik, 1978). *Low morale* among organizational members grows as conflict becomes widespread and a mean mood dominates the climate (Billings, Milburn, & Schaalman, 1980; Bozeman & Slusher, 1979).

The elimination of *slack resources* like contingency accounts, reserves, or new project funds and of organizational redundancies is also a natural reaction to the increase in competing demands for operating funds (Boulding, 1975; Boyd, 1979). This in turn reduces the organizational flexibility needed to cope with unfamiliar or uncertain conditions and leads to *centralization* of decision making, since top management is tightly controlling resources and mistakes become more visible and less affordable (Rubin, 1977, 1979; Starbuck, Greve, & Hedberg, 1978; Starbuck & Hedburg, 1977).

Centralization, however, leads to organizational leaders serving as *scapegoats* for the frustrations and anxieties felt by organizational members, and *loss of leader credibility* occurs because of leaders' implied failure either to protect organizational members from pain or to turn around the decline (Bozeman & Slusher, 1979; Hall & Mansfield, 1971; Krantz, 1985). Leadership anemia is a frequent result because voluntary turnover increases. The most marketable or capable leaders are usually the first to leave (Hirschman, 1970; Levine, 1979; Whetten, 1984).

Several authors have also identified a short-term orientation under conditions of decline with short-term responses to immediate crises, conflicts, and constituencies' demands supplanting long-term planning (Anderson, 1976; Hall & Mansfield, 1971; Holsti, 1978; Smart & Vertinsky, 1977).

¹ In the literature on decline, assumptions of causality are usually present. Most writers assume that decline produces organizational dysfunctions. Because we do not have longitudinal data on organizational attributes, however, we did not address the issue of causality in this research.

These particular dysfunctional organizational attributes associated with decline are not a comprehensive list; rather, they constitute a core set of attributes around which there is marked agreement. Table 1 summarizes these 12 dysfunctions. The primary purpose of this investigation was to assess the extent to which these predicted dysfunctional attributes are more prevalent under conditions of decline than under conditions of growth or stability. Stability is an ambiguous concept however. Whetten identified stability with decline, calling it decline-as-stagnation (1980: 346-347); others have viewed stability more positively (Starbuck & Hedberg, 1977). Organizational stability can connote a desirable permanence and steadiness or an undesirable immobility and stagnancy, depending on what organizational

TABLE 1
Dysfunctional Consequences of Organizational Decline

Attributes	Explanations	Questionnaire Items
Centralization	Decision making is passed upward, participation decreases, control is emphasized.	Major decisions are very centralized.
No long-term planning	Crises and short-term needs drive out strategic planning.	Long-term planning is neglected.
Innovation curtailed	No experimentation, risk-aversion, and skepticism about non-core activities.	Innovative activity is increasing. ^a
Scapegoating	Leaders are blamed for the pain and uncertainty.	Top administrators are often scapegoats.
Resistance to change	Conservatism and turf protection lead to rejection of new alternatives.	There is lots of resistance to change in this school.
Turnover	The most competent leaders tend to leave first, causing leadership anemia.	There is a great deal of turnover in administrative positions.
Low morale	Few needs are met, and infighting is predominant.	Morale is increasing at this institution. ^a
Loss of slack	Uncommitted resources are used to cover operating expenses.	We have no place that we could cut expenditures without severely damaging the school.
Fragmented pluralism	Special interest groups organize and become more vocal.	Special interest groups within the school are becoming more vocal.
Loss of credibility	Leaders lose the confidence of the subordinates.	Top administrators have high credibility. ^a
Nonprioritized cuts	Attempts to ameliorate conflict lead to attempts to equalize cutbacks.	When cutbacks occur they are done on a prioritized basis. ^a
Conflict	Competition and in-fighting for control predominate when resources are scarce.	Conflict is increasing within this institution.

^aItem was reverse-coded.

attributes are associated with it. A second purpose of this study was to investigate whether stable organizations are more like declining organizations, evidencing decline-as-stagnation, or like growing organizations, evidencing desirable permanency. Thus, our two research questions were: (1) Do the attributes of declining organizations differ from those of growing and stable organizations in the directions predicted by the literature? (2) Do the attributes of stable organizations most resemble those of declining or growing organizations?

METHODS

Investigating decline at only one time risks the possibility that it is a temporary aberration from a normal pattern of growth that the focal organization may not even recognize. Assessments of decline should include multiyear trends to assure that an organization really is experiencing decline. We chose to study selected colleges and universities in the United States for two reasons. First, they could provide appropriate data. A substantial number of colleges and universities that are similar in most other respects have variously experienced decline, stability, or growth in recent years; revenue and enrollment data were available over several years for these institutions; and we could assess dysfunctional characteristics as part of a broad study of organizational attributes and performance. Second, much of the literature on decline has emerged from studies of colleges and universities.²

Sample

Presidents in a stratified random sample of four-year institutions of higher education were contacted by mail in late 1982 and asked to grant permission for their institutions to participate in the investigation; 334 agreed. We stratified institutions on the basis of three control variables: size of enrollment; public or private control; and declining, stable, or growing enrollments and revenues. The sample is representative of the entire population of four-year schools in the United States relative to these three control variables.³ Public institutions constituted 38 percent of the sample ($n = 127$) and private schools, 62 percent ($n = 207$); 180 schools, or 54 percent, were classified as small, with full-time enrollments (FTE) of 200–2,500; 120, or 36 percent, were medium-sized, with 2,500–10,000 FTE; and 34, or 10 percent, were large, with 10,000–20,000 FTE.

At each of the 334 schools, we identified individuals who could provide an overall perspective because organizational decline, not subunit or individual decline, was of interest to us. These respondents, who were members of the internal dominant coalitions of their institutions (Cameron, 1986), included presidents, chief administrators for academic, financial, student, and

² For a list of these studies, see Zammuto's (1983) bibliography.

³ The total population is 36 percent public and 64 percent private; 60 percent are small, 31 percent are medium-sized, and 9 percent are large schools.

external affairs, chief institutional research officers, selected academic department heads, and selected members of boards of trustees. We contacted from 12 to 20 at each institution, choosing approximately six administrators, six department heads, and six trustees. In all, 3,406 individuals provided responses. Of these, 1,317, or 39 percent, were administrators; 1,162, or 34 percent, were department heads; and 927, or 27 percent, were trustees. Response rates among institutions ranged from 48 to 71 percent, and the overall response rate was 55 percent. ANOVAs comparing respondents revealed no systematic biases in terms of job classifications—trustees, for example, did not give answers that systematically differed from administrators' or faculty's answers.

Measurements and Analyses

A questionnaire was constructed and mailed to each potential respondent in February 1983. Table 1 lists questions assessing the 12 dysfunctional attributes; responses were on 5-point scales ranging from strongly agree to strongly disagree. The questionnaire was designed to assess other variables not included in this study, so to control its length, we used single-item scales to assess the dysfunctional attributes. Because it was not possible to assess the reliability of these measures with the traditional multiple-item approach, we used a form of the repeated-measures approach, examining the amount of agreement among respondents at each institution with one-way analysis of variance. If individuals within an institution produced ratings of each attribute that were more similar than they were to those of respondents outside their institution, some confidence in the reliability of the items was warranted because items had been assessed several times, across multiple respondents. A significant main effect for institution resulted from the ANOVAs on each attribute ($F = 1.41\text{--}1.84$, $df = 332, 3072$, $p = .000$), suggesting that the items are reliable in terms of repeated measurements within institutions.⁴

Data on each institution's revenue came from the Higher Education General Information Survey, which the National Center for Educational Statistics administers each year. We used the six years immediately preceding the administration of our survey, 1977–82, in our analyses. Approximately five months had passed between the end of the latest fiscal reporting period and our collection of the questionnaire responses.

One approach to analyzing the relationships between dysfunctional attributes and decline would have been to regress the average attribute scores for each institution on change in revenue over the six years. However, without data transformation, this procedure would not determine whether conditions of stability were more like decline or more like growth. The literature suggests that these dysfunctional attributes are discontinuous in their relationships with changes in revenue—present in conditions of decline and absent with growth or stability. Moreover, inspection of our data indicated

⁴ Results of these 12 analyses are available from the first author.

that the relationship between the negative attributes and revenue change was, in fact, nonlinear. We could therefore best assess the relationships of interest by classifying institutions as growing, stable, or declining. Although forming institutional groups sacrifices some variance, this procedure best captures the predictions made in the literature and the patterns found in our data. Thus, we grouped institutions according to their revenue patterns over the period.

To determine cut-offs, we interviewed approximately 40 administrators regarding the size of a change in revenue that would likely trigger—or already had triggered—dysfunctional attributes and also conducted a detailed analysis of natural discontinuities in the institutions' revenue patterns. On the basis of this information, we classified institutions experiencing a more than 5 percent drop in revenue, adjusted for inflation, as declining, classified those experiencing an increase of more than 5 percent as growing, and classified all others as stable. We used multivariate analysis of variance to compare the three groups of institutions at the organizational level. Previous research on colleges and universities suggested that the distinction between public and private control may be significant among institutions because of differences in funding sources, dependence on tuition, and so forth. It also suggested that institutional size may be an important qualifier of research results because larger systems have more potential slack (Cameron, Whetten, Kim, & Chaffee, 1985). We included these two variables as potential modifiers of a main effect of decline, entering both into the MANOVAs before the measure of decline so that a powerful decline effect would not be confounded with their main effects.

How to measure and define decline when such categorizing occurs is a point of controversy and ambiguity in the literature (Cameron et al., 1985). Multiple options exist, although most studies merely subtract revenue at time 1 from revenue at time 2. We determined that an accurate assessment of our two main research questions required comparing institutions that experienced pure decline, growth, and stability rather than a mixture of patterns. Therefore, we report only results from those institutions that experienced decline, stability, or growth in each of the six years ($n = 35, 23, \text{ and } 137$, respectively), thus avoiding contamination of the three conditions. After we eliminated schools that experienced combinations,⁵ 195 institutions remained,

⁵ We also conducted analyses using a variety of other operational definitions of decline and including all 334 schools. For example, we asked respondents whether or not their institutions had experienced decline in the past five years and designated as declining institutions those in which 100 percent agreement among respondents existed. In another analysis, we categorized institutions that experienced more years of decline than any other pattern as declining and also used time 1 (1977) revenue subtracted from time 2 (1982) revenue to define decline. In addition, we used enrollment trends instead of revenues in the analyses to define growth, stability, and decline. Results were largely consistent with all these definitions in that the main conclusions of the study did not change. We assert, however, that the operational definition reported here is the best, both because it makes the most theoretical sense and because it is truest to our research intentions. Results of the other analyses are available from the first author.

(continued)

which were still representative of the total U.S. population of four-year institutions in terms of the control variables.⁶

RESULTS

The first research question was, "Do the attributes of declining organizations differ from those of growing and stable organizations in the directions predicted by the literature?" We compared the three classifications of institutions, using a MANOVA. Table 2 presents means, standard deviations, and intercorrelations for the dysfunctional attributes, and Table 3 reports the results. A statistically significant main effect is present ($p < .004$), indicating that significant differences exist among the three institutional groups. An examination of the mean scores on the dysfunctional attributes for each group suggests that the most negative attributes are associated with declining institutions. Univariate analyses produced only five significant individual attributes, however. Nonsignificant attributes focused on such financial and structural factors as elimination of slack, nonselective cutbacks, lack of long-range planning, and centralization. These attributes might be expected to show less variance than the other attributes since they are difficult to change and involve many segments of an institution. This is speculative, however, and finer-grained analyses are needed regarding these individual attributes.

There were significant interaction effects of decline with type of control ($p < .02$) and institutional size ($p < .05$), as well as a significant main effect for type of control ($p < .001$). These results highlight the fact that the dysfunctional attributes associated with decline are much more typical of small, private institutions than of public or large institutions. Six of the 12 attributes are statistically significant in individual ANOVAs in interactions between decline and control, but only one is significant in interactions between decline and size.

One explanation for these findings is that many small institutions lack extensive resources to begin with, and private institutions also lack an automatic funding source like state government; thus, they experience decline as much more threatening than it is in state-supported institutions. When stability or decline occur in private schools, particularly small ones, they may actually threaten institutional survival. Therefore, certain dysfunctional attributes may be more likely to be present. Another possible explanation is that

We recognize that collapsing institutions into categories and eliminating those with mixed patterns of revenue change constrains variance of the dysfunctional attributes. However, the major research questions being addressed are consistent with such a strategy. Maximum variance is not so important here as is refinement of the variables and operational definitions. Investigating mixed patterns of revenue change or the strength of a linear relationship between revenue change and dysfunctional attributes would be interesting but is beyond the scope of this study.

⁶ In the subsample of 195 institutions, 35 percent are public and 65 percent are private; 50 percent are small, 40 percent are medium-sized, and 10 percent are large; 39 percent of the respondents are administrators, 34 percent are department heads, and 27 percent are trustees.

TABLE 2
Means, Standard Deviations, and Intercorrelations^a for All Variables

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Centralization	3.51	.44															
2. No long-term planning	2.53	.64	21														
3. Innovation curtailed	3.54	.42	-34														
4. Scapegoating	2.59	.44															
5. Resistance to change	2.94	.51															
6. Turnover	2.36	.68															
7. Low morale	3.07	.42															
8. Loss of slack	2.70	.51															
9. Fragmented pluralism	3.04	.46															
10. Loss of credibility	3.39	.51															
11. Nonprioritized cuts	3.44	.40															
12. Conflict	2.73	.57															
13. Decline/stability/growth	1.48	.78															
14. Size	1.62	.67															
15. Type of control	1.65	.48															

^a Decimal points omitted.

TABLE 3
Results of MANOVAs and ANOVAs for Effects
of Decline/Stability/Growth on Organizational
Dysfunctions Controlling for Institutional Control and Size

(a) MANOVA Results^a			
Effects	F	df	Significance Levels
Decline/stability/growth (DSG)	2.01	24,334	.004
Type of control	4.04	12,168	.001
Size	1.39	24,334	.112
DSG × control	1.90	24,334	.016
DSG × size	1.43	48,668	.050
DSG × control × size	1.23	24,334	.474

(b) ANOVA Results		Significance Levels		
Dysfunctions	DSG	Control	DSG × Control	DSG × Size
Centralization	.45	.23	.04	.31
No long-term planning	.24	.68	.00	.46
Innovation curtailed	.02	.40	.14	.12
Scapegoating	.01	.28	.00	.24
Resistance to change	.00	.45	.16	.47
Turnover	.01	.23	.02	.02
Low morale	.65	.13	.09	.84
Loss of slack	.83	.00	.98	.51
Fragmented pluralism	.21	.00	.15	.87
Loss of credibility	.13	.66	.20	.92
Nonprioritized cuts	.39	.06	.00	.59
Conflict	.07	.35	.11	.83

(c) Contrasts^b			
	F	df	Significance Levels
Growing versus stable	2.11	12,137	.020
Growing versus declining	2.15	12,150	.020
Stable versus declining	1.13	12,036	.370
Growing versus stable & declining	2.63	12,172	.003

^aPillai's trace was used because it is the most conservative and robust test.

^bGroup means are as follows: declining = 2.92, stable = 2.79, and growing = 2.69.

the significant attributes in the decline-control interaction—centralization, lack of long-range planning, turnover, nonprioritized cuts—are related to managerial reactions. Differences on these variables fit the implication that administrators of small, private schools experience decline more severely than administrators of large, public schools do.

The second research question, "Do the attributes of stable organizations most resemble those of declining or growing organizations?" was examined using post hoc contrasts among the three different conditions—growth, stability, and decline (Table 2). Levels of dysfunctional attributes are not significantly different under decline and stability, but the differences are significant for stability and growth. Comparisons between decline and growth

also are statistically significant, and strong differences emerge from a comparison of growth with decline and stability. These findings suggest that (1) the dysfunctional attributes of decline manifest themselves as strongly under conditions of stability, or decline-as-stagnation, as they do under conditions of absolute decline, or decline-as-cutback (Whetten, 1980: 346–347); (2) the same dysfunctions are not present under conditions of growth.

CONCLUSIONS

This study began to explore empirically the extent to which declining organizations exhibit a set of dysfunctional characteristics that the literature has attributed to them. Two main conclusions seem appropriate.

First, many, but not all, of the negative attributes the literature views as associated with decline are significantly more characteristic of declining organizations than of growing organizations. This is mainly true, however, in privately controlled organizations that are small and seemingly quite vulnerable to constrained environmental resources to begin with. In large, public institutions, the dysfunctions of decline are less likely to be present. Three of the 12 variables predicted in the literature are not significantly associated with decline: lack of slack resources, loss of leader credibility, and fragmented pluralism. This may be because few colleges and universities in the 1980s, regardless of revenue patterns, consider themselves to have an abundance of slack resources. Moreover, top administrators may maintain credibility in spite of conditions of decline because organizational members perceive them to have limited control over their circumstances (Boulding, 1975; Cyert, 1978). In addition, the loosely coupled structure of colleges and universities may foster pluralistic constituencies regardless of growth and decline patterns. More research is needed on each of these individual attributes, however, before precise explanations are possible.

The second conclusion is that comparisons between growing, stable, and declining organizations indicate that the negative attributes predicted to be associated with decline are actually characteristic of both stable and declining organizations. Only institutions with growing revenues appear to avoid these dysfunctional organizational attributes.

In retrospect, the association between stability and the dysfunctions of decline appears logical for at least three reasons. First, when organizations become accustomed to abundance and unbridled growth, as was typical of American institutions of higher education in the 1960s and early 1970s, members interpret zero budget increases, limited mobility, hiring freezes, and other such characteristics of stability as relative deprivation (Davies, 1962). What they could view as steadiness and constancy in bad times they instead experience as threatening and discouraging in comparison to a previous standard of plenty. Dissatisfaction, conflict, and scapegoating, among other reactions, are well-confirmed consequences of such conditions (Davies, 1962).

Second, a strong cultural bias comes into play. Traditionally in this country, growth is defined as good and decline as bad (Cyert, 1978; Whetten, 1980). If an institution is not growing, its members think something must be wrong—management must be doing a poor job, the institution's worth must be questionable, competitors must have better services, constituents must evaluate the institution negatively, and so forth. Although this study presents no evidence for causal directionality, we might hypothesize that this sense of relative deprivation and threat, as well as the violation of the growth-is-good value, produces subsequent organizational dysfunctions.

Third, organizations commonly use slack resources to maintain coalitions, resolve conflicts, and fund innovations. When no slack exists, as in times of decline, the positive organizational processes dependent on slack resources are inhibited (Bourgeois, 1981; Chakravarthy, 1982; Dess & Beard, 1984; Pfeffer & Salancik, 1978). Under growth, they can use uncommitted resources to maintain adaptability and enhance morale by providing institutional members with what they want, establishing boundary-spanning units and environmental buffers, and creating opportunities for trial-and-error learning. Decline largely eliminates these opportunities since institutions then generally use discretionary funds to meet operating expenses. Dysfunctional reactions result.

These conclusions add an important dimension to our understanding of processes of growth and decline in organizations. Specifically, they calibrate the meaning of organizational decline. Although Whetten's (1980) distinction between decline-as-stagnation, or stability following a period of growth, and decline-as-cutback, or absolute decreases in resource levels, may be useful in sensitizing us to different forms of decline, these conditions actually are associated with the same organizational dysfunctions. This suggests that the central distinction in the literature investigating organizational life cycles should be one between growth and nongrowth, rather than the one between decline and nondecline now prevalent in the literature (Kimberly & Miles, 1980). Moreover, as we have described, organizational dysfunctions appear to be greater in privately controlled organizations.

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© Academy of Management Journal
1987, Vol. 30, No. 1, 138–151.

SOCIAL SUPPORT: ITS RELATIONSHIP TO OBSERVED COMMUNICATION WITH PEERS AND SUPERIORS

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Supportive relations at work may be critically important to the maintenance of psychological well-being and physical health. Social support is

This research was supported by National Science Foundation Grant No. BNS-8008456. Special thanks are due to A. Jamesson, D. Kolodny, H. Sachs, and D. Weissman, who served as observers; to S. Stout, who assisted in the analysis of data; and to G. Hausfater, R. Moos, and A. W. Wicker, who commented on earlier drafts of this manuscript.

information that leads a person to believe that he or she is "cared for and loved, . . . esteemed and valued, . . . belongs to a network of communication and mutual obligation" (Cobb, 1976: 300). Researchers investigating the workplace have long recognized social support and the closely related concepts of interpersonal warmth, trust, and openness as core dimensions of organizational or communication climate (Goldhaber, Yates, Porter, & Lesniak, 1978; Hellreigel & Slocum, 1974; Schnake, 1983) that may affect many organizational outcomes, including job satisfaction and performance.

In spite of extensive research, the role of social support in moderating or attenuating the detrimental effects of organizational stress on personal functioning remains controversial. There are several explanations for the inconsistency in empirical findings (Thoits, 1982). Studies have used ad hoc measures of social support of undemonstrated reliability and validity. Moreover, the general problem of shared method variance is particularly acute in studies that rely exclusively on self-report measures. More fundamentally, researchers have not empirically established linkages between perceptions of social support and underlying behavioral mechanisms like the process and content of interpersonal communication (Cohen & Wills, 1985).

This study sought to relate employees' perceptions of social support to measures of their actual face-to-face interactions with peers and superiors. There is considerable evidence that employees' satisfaction with interpersonal relations and perceived openness and trust are related to interpersonal communication (Goldhaber et al., 1978; Jablin, 1979; Klauss & Bass, 1982). For instance, trust appears to increase the amount of information communicated and to reduce the tendency to filter unfavorable information (O'Reilly & Roberts, 1974).

In studying social support at work, we considered three important dimensions of communication. The first concerns the source of information, or who initiates an interaction. It is important because initiating interaction may enhance (1) personal control and (2) positive feelings. Lawler, Porter, and Tennenbaum (1968) showed that people evaluated self-initiated interactions more favorably than interactions others initiated; they pointed out that initiators have more personal control than the persons with whom they interact. Perceived control or influence in a job environment is especially important to stress reduction (Fisher, 1984). In terms of stress alleviation and social support, control is one mechanism that appears to explain why people see some interpersonal relations as supportive and others as not supportive (Cohen & Syme, 1985).

The second dimension of communication at work relevant to supportiveness is direction of information flow, which can be lateral or vertical—with peers or with superiors. Research on stress and social support has: (1) differentiated social support by source—peers or superiors—and (2) found that the stress-alleviating effects of social support are often due specifically to supervisory support (Cohen & Wills, 1985; Kasl & Wells, 1985). With regard to organizational communication, there also is evidence that employees who perceive high social support make relatively greater use of superiors than

peers as a source of information (O'Reilly, 1977). Hence, interactions with superiors may contribute importantly to perceived social support at work.

A third relevant dimension in determining perceived support is an interaction's content, especially its task relevance. The importance of nontask communication is evident in Burke and Wilcox's (1969) finding that perceived openness in what can be said between subordinates and superiors was associated with greater satisfaction with both superiors and jobs. More recently, Cohen and Wills (1985) speculated that social visiting or companionship may in and of itself be a source of social support. Talking about nontask-related concerns on the job may enhance the perceived supportiveness of interpersonal relations.

Our research examined the effects of source, direction, and content of communication on perceived social support, using observational records of employees' actual face-to-face interactions with peers and superiors. In spite of the seemingly large amount of previous research on communication, the evidence concerning the relationship of actual communication to social support remains incomplete. Although separate studies have analyzed source, direction, and content, no one has investigated these variables as they simultaneously influence perceptions of social support. Moreover, although previous research on communication and organizational climate has examined the correlates of interpersonal trust and openness—concepts directly related to social support—much of the data are “nonbehavioral, with real-world references seriously lacking” (Dennis, Goldhaber, & Yates, 1978: 255). The present work extended previous research by incorporating both observational methods and a self-report instrument, thereby minimizing shared method variance in explanatory and criterion variables. Our goals were (1) to determine the extent to which overt behavior predicted perceptions of social support, and (2) to examine the simultaneous influence of the source, direction, and content of interactions on perception.

METHODS

Participants and Research Setting

Participants were 60 police officers and civilians employed as radio dispatchers whom we randomly selected from the personnel rosters of 12 police stations located in rural and urban communities of a northeastern state. All stations were part of a statewide police organization; as such, they were quite similar in physical layout, administrative structure, and operating procedures. All trained new employees at a central facility. The percentage of selected employees at each station who agreed to participate ranged from 85 to 100 percent. Average tenure with their police stations was 6 years, with a range from 1 to 17 years. Most of the participants—78 percent—were police officers; the remainder were civilians. The sample included 51 men (85%), and ages ranged from 22 to 68 years with the mean being 35 years. All participants had finished high school; 49 percent had also completed some college courses, and 10 percent had graduated from college.

On the job, dispatchers handled in-person complaints from the public, communicated by radio with police officers on the road, answered telephone calls from the public and from other agencies, placed telephone calls to other local and state agencies, and sent computer inquiries concerning such matters as drivers' licenses and vehicle registrations. In sum, dispatchers played a critical role in police organizations since they screened all complaints from the public, decided whether or not to send patrol officers, and decided which officer to send.

Although each station assigned only one radio dispatcher to work each shift, the typical shift afforded many opportunities for the dispatcher to interact face-to-face with police officers and superiors. On each workshift, a sergeant or a lieutenant served as supervisor, usually working throughout the shift in an office adjacent to the dispatch room. Officers on patrol often returned to the station to consult with the supervising officer, process an arrested suspect, interview a witness, log a criminal complaint, complete a written report, or simply take a break and relax.

Procedures

On each day of observation, one trained researcher sat in the same room with one focal individual throughout an eight-hour workshift and entered into a handheld electronic digital recorder selected characteristics of all communications between the dispatcher and other employees. Five observers collected data over a period of ten months.

Our analyses dealt exclusively with verbal face-to-face communication—we excluded mediated communication via telephone or police radio from consideration since its potential for affecting perceived social support is limited. Dispatchers almost always conducted mediated conversations with peers and superiors via police radio, and federal guidelines severely restrict the content, phrasing, and length of such transmissions. Moreover, a substantial proportion of interactions with superiors ($\bar{x} = .75$, *s.d.* = .30) and peers ($\bar{x} = .42$, *s.d.* = .23) were conducted face-to-face.

In order to segment continuous streams of behavior into discrete units, we developed criteria for identifying the beginnings and ends of face-to-face interaction. We defined a unit of action in terms of constancy of direction. Whenever a change occurred in the direction of the focal individual's behavior, a new action had begun (Barker & Wright, 1955).

Each interaction was classified on the basis of three dimensions: source—who initiated the communication, the focal individual or someone else; direction—the status of the person who spoke to the focal individual, whether peer or superior; and content—work-focused or nonwork. Thus, communication with superiors had four categories: interactions initiated by dispatchers about topics (1) focused on work or (2) not focused on work, and interactions initiated by superiors about (3) work or (4) not about work. Four parallel classifications divided communication with peers. We also recorded simultaneous interactions with peers and superiors, but, since these ac-

counted for less than 8 percent of all interactions, we dropped them from the analysis.

For our purposes, a superior was an officer of higher formal rank than a focal person, with the authority to direct and evaluate that person's activities. Dispatchers' peers were persons of the same rank whose job responsibilities also included dispatching. Since most stations rotated the assignment of dispatcher daily, the person who functioned as dispatcher one day was on patrol the next. Thus, peers had recently been dispatchers, but were not concurrently functioning as such.

Work-focused content encompassed references to past, present, or future work responsibilities as well as to the broader organizational context or to professional goals—asking senior officers about the difficulty of an organization's written examination for promotion is an example. Nonwork-focused content generally concerned leisure activities, politics, personal problems, or relations with friends or family.

For each of eight categories of communication, we computed a rate per hour and an average duration. In all statistical analyses, we excluded participants from any given category of communication in which both their rate and average duration were zero.¹

Throughout data collection we checked agreement among observers at two-week intervals during regularly scheduled observations. To minimize observer drift in accuracy owing to gradual changes in criteria for categories (Longabaugh, 1980), we monitored agreement between each of four observers and a fifth observer, the first author, who always acted as the standard. For a prescheduled 90-minute session, one observer and the standard simultaneously recorded participants' behaviors. Observers regularly met to receive feedback on the accuracy of their coding, to review category criteria, and to discuss any difficulties encountered in applying criteria in specific situations. We calculated interobserver agreement with the statistic kappa (Hartmann, 1977), which corrects proportions of agreements for chance or expected agreement. We defined agreement on duration—identification of the beginning and end of an interaction—as two independent observers' recording the same number of seconds or a difference of no more than two seconds. For the behavioral categories, we defined agreement as both observers' independently assigning the same code to a behavior. The mean kappa for duration was .80; it was .84, .86, and .83 for the behavioral categories of source, direction, and content, respectively.

One important question in any observational study is the effect of an observer's presence on what is being measured. Although ethical and practical concerns precluded the use of covert observation as an experimental control, it was possible to record dispatchers' behavioral reactions to

¹ We excluded these participants to increase the normality of the distributions of rates and average durations. Table 1 reports the number of participants with nonzero values for each category of interaction.

observers and then to correlate rates of these reactions with rates and durations of communication (Kirmeyer, 1985). Neither rate nor average duration of categories of communication was related to participants' responsiveness. This evidence suggests that an observer's presence had little effect on interpersonal communication.

The measure of perceived support was a nine-item subscale of the Work Environment Scale (Moos, 1981) that assesses the extent to which employees see others in an organization as, for example, willing to "go out of their way to help a new employee feel comfortable" or as "frank about how they feel." We administered it individually during private interviews scheduled within two months after observation. Moos reported adequate internal consistency for this subscale ($\alpha = .69$) and one-month test-retest reliability of .71 for a representative sample of employed adults. For the present sample, $\alpha = .63$.

Results

Observers recorded an average of 107 face-to-face interactions between dispatchers and their superiors or peers per workshift. Table 1 presents the frequencies, percentages of interactions, and their rates and durations by category. Dispatchers spoke with their peers more than twice as often as with their superiors; such conversations equaled 68 percent of all interactions. Communications generally concerned work responsibilities (79%) rather than topics unrelated to the job. In most work-focused interactions (69%), the focal individual was the recipient rather than initiator. In contrast to this responsive role in work-focused communication, focal individuals typically initiated nonwork interactions; 61 percent of nonwork interactions were self-initiated. Thus, the content and source of communication were not independent dimensions. Likewise, direction and content were also interdependent. For instance, although superiors initiated a substantial number—71 percent—of work-focused exchanges, they initiated many fewer nonwork exchanges (47%).

Interactions were consistently brief in duration, averaging less than one minute ($\bar{x} = 43$ seconds, $s.d. = 10$). However, significant variation in average durations occurred by source, content, and direction. Interactions that participants initiated themselves were significantly longer ($\bar{x} = 49$) than those that others initiated ($\bar{x} = 40$, $t_{59} = 3.72$, $p < .001$). When dispatchers spoke about nonwork-focused ($\bar{x} = 60$) as compared to work-focused topics ($\bar{x} = 38$), their interactions were significantly longer ($t_{59} = 7.65$, $p < .0001$). Vertical conversations between dispatchers and superiors ($\bar{x} = 37$) were significantly shorter than lateral communications between peers ($\bar{x} = 46$, $t_{58} = 3.59$, $p < .007$).

To examine the contributions of communication to social support, we used hierarchical regression. Since little information was available from prior research on the relationship of rates of interaction to their average durations, we examined their intercorrelations. Table 2 presents the correlations among rates, average durations, and social support. Few of the correlations between rates and average durations were statistically significant, indi-

TABLE 1
Frequencies, Percentages, and Rates of Interaction
by Category

Source/Direction	n ^a	Frequencies	Percentages	Rate per Workshift			Duration ^b		
				Medians	Means	s.d.	Medians	Means	s.d.
Work content									
To superior	58	757	9.9	6.1	9.0	8.4	32.4	36.2	20.0
To peer	60	1,584	20.8	12.4	16.5	16.2	36.5	39.7	21.7
From superior	60	1,828	24.0	16.0	21.0	17.4	34.7	33.6	11.3
From peer	60	3,456	45.3	35.0	36.0	20.3	37.6	37.7	12.7
Totals		7,625	100.0						
Nonwork content									
To superior	51	230	11.4	2.4	3.8	4.4	52.3	57.1	38.9
To peer	56	1,000	49.7	11.0	11.8	8.6	57.7	63.7	28.4
From superior	50	200	9.9	2.1	3.5	5.3	37.0	42.6	24.1
From peer	54	584	29.0	6.9	7.0	5.0	52.2	61.9	42.2
Totals		2,014	100.0						

^a Numbers designate participants with nonzero values for each particular category of communication.

^b Duration was measured in seconds.

cating that the two measures provided unique information. Moreover, both types of measures yielded a larger number of significant correlations with social support than chance alone would have predicted.

For regression analyses, we divided rates and average durations into two ordered sets by content—work- or nonwork-focused, entering data in that order. We examined nonwork communication after partialling out communication that was related to the job itself because the very occurrence of job-related communication may increase the likelihood of nonwork communication. Within these sets, order of entry was determined *a priori*; we entered self-initiated communication before other-initiated communication, and communications with superiors before those with peers. Given the necessarily small size of our sample, we limited the communication measures entered to those variables that were significantly correlated with social support (see Table 2). Additionally, to reduce multicollinearity we combined two highly correlated measures, self- and other-initiated work interactions with peers ($r = .67, p < .001$), to yield an hourly rate of all work-focused interactions with peers.² We did not control for gender, age, education, job tenure, civilian or officer status, and rural versus urban location of station because none of these were significantly correlated with either observed communication or perceived social support.

Table 3 presents the results of regression analyses. The five categories of communication accounted for 41 percent (adjusted $R^2 = .35$) of the variance in perceived social support ($F_{5, 48} = 4.82, p < .002$).³ Variance in social support explained by actual communication was substantial, given that no shared method variance inflated the relationship of behavior to perception and that social support was measured well after we had completed the observations. Among work-focused interactions, self-initiated communication with superiors was positively related to perceived social support, accounting for 10

² Using this composite of self- and other-initiated interactions with peers enabled us to avoid instability in regression results caused by redundancy in the association of these two variables with social support. Specifically, when we used regression to examine the individual contributions of work-focused, self- and other-initiated interactions with peers, we found that the statistical significance of these two variables much depended on order of entry. Whichever variable entered first was significant, and the other was not. A similar instability in statistical significance was not evident when we reversed the order of entry for work-focused interaction with superiors initiated by self and others.

³ To examine the stability of regression findings, we performed several additional analyses. In one such analysis we included all 60 participants, rather than only those with nonzero rates and average durations for measures of communication. The regression results for this sample did not differ importantly from those reported in Table 3; communication variables accounted for 32 percent (adjusted $R^2 = .26$) of the variance in perceived social support ($F_{5, 54} = 5.15, p < .0001$). In a second set of analyses, we examined whether the addition of demographic controls changed results as reported in Table 3. In each of six regression equations, we entered one control variable—gender, education, age, job tenure, station's location, or status—first, then the five measures of communication. Findings further corroborated results reported in Table 3; none of the control variables accounted for significant amounts of variance in social support or changed the contributions of the communication measures in either magnitude or direction.

TABLE 3
Results of Hierarchical Regression of Social Support
on Observed Communication^a

Independent Variables	Betas ^b	R ²	Increment to R ²	Incremental F
Rate of work-focused communication to superiors	.31*	.10		
Rate of work-focused communication from superiors	.07	.11	.01	0.55
Rate of work-focused communication to or from peers	-.33*	.23	.12	7.64**
Average duration of work-focused communication to superiors	.30*	.30	.07	4.80*
Average duration of nonwork-focused communication from peers	.35*	.41	.11	8.74**

^a For the final equation, $F_{5, 48} = 4.82, p < .002$.

^b These are standardized regression weights for the final equation.

* $p < .05$

** $p < .01$

percent of the variance ($F_{1, 52} = 4.13, p < .05$). Dispatchers who initiated interactions with superiors about work fairly often tended to perceive others as supportive. After the contribution of self-initiated interactions with superiors had been accounted for, the incremental gain accrued from adding superior-initiated work communication was negligible.

In contrast to the positive relationship between social support and work-focused interaction with superiors, dispatchers' work-focused interactions with peers—initiated and received combined—were inversely related to perceived support. Dispatchers who spoke with peers about work often perceived their relations at work as relatively less supportive. One possible reason was that these interactions increased their work loads by placing them in a responsive, service role. When peers spoke with them about work responsibilities, the peer generally initiated the interaction; 69 percent of these interactions were initiated by peers. Therefore, the needs of the peer rather than of the focal individual determined its timing and purpose. Previous research (Moos, 1974) on social climate in service organizations has shown that both staff and clients associate heavy client loads with a perceived lack of supportiveness.

After accounting for the contributions of rates of communication to social support, we entered two measures of communication length. The first, average duration of self-initiated work exchanges with superiors, contributed an additional 7 percent to explained variance. Individuals who initiated relatively long interactions with their superiors on work topics felt more supported. This positive relationship was an exception to the general finding that long conversations with superiors were associated with low perceived support. Simple correlations between social support and average

duration were negative and nonsignificant for all other categories of communication with superiors (Table 2).

The fifth and last variable entered was the average duration of responsive communication with peers. This was the only measure of nonwork communication that contributed significantly to perceived support, and it explained an additional 11 percent of the variance. Participants whose peers initiated long conversations with them about nonwork topics such as leisure pursuits, family relations, and politics felt more socially supported at work than other participants.

DISCUSSION

These findings demonstrate that the perception of social support is indeed linked to actual face-to-face interaction in the workplace. Although our findings are correlational and do not establish causality, they do shed light on the interaction patterns that alter—or are altered by—perceptions of interpersonal supportiveness.

With regard to directionality of information flow, much of previous research on communication and perception of openness and trust has focused on the superior-subordinate relationship; peer relations have received less attention (Goldhaber et al., 1978). Our results suggest that vertical and lateral communication are each related to supportiveness, but in opposite directions. The category of communication that most enhanced—or was enhanced by—the perceived interpersonal atmosphere at work was subordinate-initiated, one-to-one interaction with superiors about job responsibilities. For this category, measures of both the hourly rates and lengths of interactions were positively related to support. Although the importance of superiors' accessibility in relationship to subordinates' perceptions of support was consistent with previous research (Lawler et al., 1968; O'Reilly, 1977), it was noteworthy in light of the content of this research instrument. None of items on Moos's (1981) scale dealt with superiors or subordinate-superior interpersonal relations. For practitioners, this finding suggests taking a broad approach to improving relationships between supervisors and subordinates. Organizational interventions commonly place the onus on management; for example, a field experiment by Krackhardt, McKenna, Porter, and Steers (1981) reduced turnover of bank clerks by training supervisors to initiate regular meetings with subordinates. Interventions designed to increase subordinates' effectiveness in initiating interactions with superiors may complement this more traditional management-centered approach and contribute additional gains in desired outcomes.

Although dispatchers benefited from opportunities to initiate interactions with superiors, they gained little benefit from high hourly rates of work or nonwork contact with peers. More frequent conversations with peers about work responsibilities were actually associated with lower perceived support, and more frequent conversations about nonwork matters were simply unrelated to support. However, complicating the contribution of lateral

communication, dispatchers whose peers initiated conversations of longer than average duration with them on nonwork topics felt more socially supported.

In contrast to past research on communication, which has generally failed to differentiate interactions on the basis of content (Klauss & Bass, 1982), we found that both technical conversations on job responsibilities and conversations on topics like office politics, family problems, and so forth were significantly associated with perceived social support—but communication not focused on work was significantly related to support only when peers initiated it. Moreover, the relationship between nonwork communication and social support depended on conversational length, not rate of interaction; only longer nonwork conversations indicated friendly and supportive personal ties. In evaluating the importance of measuring content, investigators should also consider its interdependence with the other dimensions of direction and source. For instance, previous research indicates that superiors tend to initiate superior-subordinate exchanges (Goldhaber et al., 1978). However, we found that although this held for work-focused exchanges, it was less true of nonwork exchanges, and thus the content of communication qualified the generality of findings on initiation.

Although our findings may appropriately be generalized to other service organizations, the unique characteristics of the police dispatchers' role and their organizations should be kept in mind. For instance, dispatchers gave priority to mediated communication via telephone and police radio over face-to-face transactions. Face-to-face communications were vulnerable to interruption and therefore were frequent but usually very short. Fewer interactions of longer duration may characterize other service professions in which there is more emphasis on face-to-face interactions with clients, especially those in which response time is less critical. It is possible that the unique demands of police dispatching altered the direction or magnitude of the relationship of communication to social support, but this possibility seems doubtful in light of our finding's general consistency with previous research.

Two weaknesses of this research should be noted. One was the relatively low internal consistency of the Moos instrument. However, Moos (1981) demonstrated internal consistency and test-retest reliability for a large and representative sample of employed adults, and research showing direct and buffering effects of social support on anxiety and physical symptoms of job stress has provided confirmation of construct validity (Billings & Moos, 1982; Kobasa & Puccetti, 1983). A second limitation was our focus on discrete verbal behaviors rather than sequential exchanges between communicators. As a result, our data cannot be used to draw inferences about dyadic exchanges.

In conclusion, social support is a construct that appears to have identifiable behavioral underpinnings. The magnitude of the relationship between actual, real-world communication and perception was encouraging, given that we did not record the functions—such as seeking information, giving feedback, and so on—or affective content of messages. The next step in re-

search may be to relate perceived social support to measures of communication's function and affective content. A high frequency of information-sharing interactions would suggest interpersonal openness and trust, and affective content is likely to convey information about whether peers and superiors value and esteem an employee; both may be especially critical to well-being under stress.

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© Academy of Management Journal
1987, Vol. 30, No. 1, 151-162.

COMMITMENT TO EMPLOYER AND UNION: EFFECTS OF MEMBERSHIP STATUS

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In recent years there has been a notable resurgence of research on commitment among employees to representing unions (Gordon, Beauvais, & Ladd, 1984; Gordon, Philpot, Burt, Thompson, & Spiller, 1980) and how such commitment is related to commitment to employing organizations (Angle & Perry, 1984, 1986; Dalton & Todor, 1982; Fukami & Larson, 1982, 1984; Magenau & Martin, 1985; Martin, 1981; Martin, Magenau, & Peterson, 1982; Schriesheim & Tsui, 1980a, 1980b). These studies have supported the notion that union members generally tend to be loyal to their unions and have challenged the accuracy of the long-standing contention that unionized em-

ployees hold dual loyalties or dual commitments to both their unions and employing organizations. Recent research has also shown that the extent of dual commitment may depend on labor-management relationship climate (Angle & Perry, 1986) and work-related experiences (Fukami & Larson, 1984). In spite of this progress in investigating these topics, a question remains about how the populations studied may have affected results.

THE ISSUE OF MEMBERSHIP

With the minor exceptions of studies by Purcell (1953) and Martin (1981), the published research on union commitment has not clearly distinguished between contexts in which union membership is voluntary and those in which membership is a condition of continued employment—that is, union shops. In the first, employees have the statutory or contractual freedom to be union members or not while holding membership in a bargaining unit. In the second, such subgroupings do not occur within bargaining units.

The distinction between voluntary and mandatory union contexts is important. Because voluntary and involuntary behaviors differ (Salancik, 1977), the results of research conducted on the commitment of union members to a union may differ across the two contexts. Further, voluntary members of unions may include three subgroups exhibiting differences in both levels of union commitment and its relationship to commitment to an employing organization: (1) current members, (2) employees who were never members, and (3) employees who have relinquished membership. In early research on this issue, Purcell (1953) found that union members had greater union allegiance than nonmembers in the same bargaining unit, but that both groups had the same degree of allegiance to the employing organization. Purcell's study presented no direct evidence on the relationship between the two types of allegiance for nonmembers. Martin (1981) again found that members had greater allegiance to the union than nonmembers, but in contrast to Purcell, he found that members also had a greater allegiance to the employing organization than nonmembers. Although Martin's results were more extensive and somewhat different from Purcell's, they require cautious interpretation because of the small numbers of union members in the bargaining unit he analyzed over a two year period—at the beginning of Martin's study, n equaled 10; at the second phase, n equaled 8. It is also important that neither of these studies distinguished between employees who had withdrawn from membership in the union and those who had never joined. Because these subgroups represent different patterns of prior membership, they warrant examination for differences.

The purpose of this study was to extend the research on commitment in voluntary union contexts by exploring (1) level of commitment to a union, (2) level of commitment to an employing organization, and (3) the extent of congruency or correlation between the two measures across three subgroups of employees in the same bargaining unit. The subgroups were: (1) union members, i.e., dues-paying union members; (2) nonmembers who were never members, i.e., employees holding jobs represented by the union who had

never belonged to the union; and (3) nonmembers who were leavers, i.e., employees holding jobs represented by the union who had once belonged to the union but had relinquished membership in it. This study explored four research questions. First, we compared the levels of commitment to the union across the three membership-status subgroups. Because union members made explicit, voluntary, and public choices to join the union (Salancik, 1977), we expected they would have higher levels of commitment to the union than those who were never members or were leavers. Similarly, because former members explicitly chose to leave the union, we expected them to have lower levels of union commitment than those who were never members.

Second, we compared levels of commitment to the employing organization across the three subgroups. The research question addressed by this comparison was whether or not union membership was related to the extent of commitment to the employing organization. As noted earlier in this section, prior research on this issue has yielded mixed results (Martin, 1981; Purcell, 1953). Further, this prior research did not address the never-member versus former-member distinction. Even though this question has been of central concern in the previous literature on union commitment, the absence of consistent empirical findings made specific predictions about subgroup differences difficult.

The third research question explored commitment congruency—the extent to which commitment to the union and commitment to the employing organization were correlated within each membership status. Since the two studies that examined subgroup differences did not investigate congruency, there was no empirical history on this question. We based theoretical predictions of congruency on a notion of mutual causality. If a common event, experience, or some other phenomenon that jointly affected the levels of both types of commitment characterized a subgroup, we anticipated congruency in the form of a significant correlation. In this sample, the members of the three subgroups shared the experience of having voluntarily chosen their subgroup, and they may or may not also have had other common experiences. This question anticipated possible subgroup differences but did not speculate on the nature and direction of those differences.

The fourth and last research question examined the relationship between union commitment and job satisfaction. It is well established that employer commitment and job satisfaction tend to be positively correlated (Mowday, Porter, & Steers, 1982), but the relationship between union commitment and job satisfaction has received substantially less attention. Several studies support the presence of a positive relationship between the two measures once union membership has been established (Gordon et al., 1980, 1984), and there is also evidence that job satisfaction may predispose employees toward union membership (Berger, Olson, & Boudreau, 1983; Hills, 1985; Kochan & Helfman, 1981). No previous research has explored the possibility of subgroup differences in this relationship, but our rationale for the third research question suggests the potential for such differences. In particular, if former members left a union in response to dissatisfaction with

union representation in the face of undesired action by their employer, it is likely that job satisfaction would be positively correlated with union commitment among these leavers. A similar argument could be made for the members, among whom the union would receive credit for high levels of job satisfaction. On the basis of these ideas, we explored the potential subgroup differences in the correlation between union commitment and job satisfaction.

METHODS

Research Setting, Procedures, and Respondents

The research took place at a facility operated by the Department of Defense engaged in the manufacture, storage, and distribution of military weapons. The facility employed approximately 6,800 civilian workers in both managerial and nonexempt positions who were represented by one of seven different unions, with job characteristics determining union affiliation. The largest of the unions, the focus of this study, was an AFL-CIO affiliated industrial union representing 1,700 blue-collar production and maintenance employees at the facility. The jobs represented at this plant were typical of those the union represented in the private sector—workers were machinists, fabricators, welders, laborers, and so forth. Although the union held exclusive bargaining rights for the production and maintenance employees, only 40 percent of employees in the bargaining unit were dues-paying members.

Using current employment and union membership rosters, we first divided the bargaining unit into members and nonmembers and generated a random sample of 300 employees within each subgroup. We collected data by means of a questionnaire survey mailed to the respondents' homes.

A total of 284 usable responses were returned, a response rate of 47.3 percent. Within the union membership subgroup, we received 150 (50.0%) usable questionnaires and we received 134 (44.6%) usable questionnaires from nonmembers. Lacking information that would allow a priori identification of past membership in the union, we asked respondents in the nonmember subgroup to indicate whether or not they had previously held union membership during their tenure in the employing organization. Of the 134 nonmembers who responded, a majority of 76 stated they had never been members, and 58 indicated previous membership.

Measures

Levels of commitment to both employer and union were measured by scales similar in part to those that Dalton and Todor (1982) and Schriesheim and Tsui (1980a, 1980b) employed. We used a reduced 11-item version of Porter's well-known commitment scale (Porter, Steers, Mowday, & Boulian, 1974) to measure commitment to the employing organization. Each item required a response on a 5-point scale with 1 = strongly disagree and 5 = strongly agree. This scale had a single-factor structure and a high level of internal reliability ($\alpha = .85$).

The union commitment measure, presented in the Appendix, included 11 items that paralleled the items in the employer commitment scale and assessed commitment to the union given representational rights (Dalton & Todor, 1982; Schriesheim & Tsui, 1980a, 1980b). Like the employer commitment scale, this scale produced a single-factor structure and evidenced strong internal reliability ($\alpha = .96$).¹ A factor analysis on the two sets of items combined—22 items—produced two factors. The first, with an eigenvalue of 8.18, represented commitment to employer; all items in that scale had loadings from .75 to .89, but the union commitment items loaded no higher than .16 on the factor. The second factor, with an eigenvalue of 4.13, had loadings for the union items from .49 to .74, but no employer item loaded higher than .20, reinforcing the scale's discriminant validity as a measure of union commitment.

To measure job satisfaction, we employed the short form of the Minnesota Satisfaction Questionnaire (MSQ) (Weiss, Davis, England, & Lofquist, 1967). On the basis of prior applications of the MSQ (Weiss et al., 1967: 4) and a factor analysis of the data collected in this study, we subdivided the job satisfaction measure into a 12-item intrinsic satisfaction scale ($\alpha = .87$) and a 6-item extrinsic satisfaction scale ($\alpha = .80$).

In addition to the psychological variables measured on the survey questionnaire, other items measured each respondent's job and organizational tenure, age, gender, race, marital status, education, and wage grade. The data on tenure and age were collected from the respondents' use of appropriate 5-point ordinal classifications (1 = less than 1 year to 5 = over 12 years) in order to assure their anonymity. We found no differences across the membership subgroups with respect to gender, race, marital status, education, or wage grade, but significant differences emerged across the three subgroups on the basis of ordinal classifications of age ($F_{2,281} = 8.76$, $p < .001$), organizational tenure ($F_{2,281} = 7.55$, $p < .001$), and job tenure ($F_{2,281} = 6.55$, $p < .01$). Furthermore, Scheffé tests indicated that union members were younger and had lower organizational and job tenure than nonmembers who had left the union, and that nonmembers who had never belonged to the union were younger and had lower organizational and job tenure than leavers.

RESULTS

Table 1 displays the means for all measures by subgroup, and Table 2 presents their intercorrelations. Because of the differences across the subgroups on age, organizational tenure, and job tenure, we used an analysis of covariance (ANCOVA) to adjust for those differences. As a preliminary, we conducted tests for parallelism on the covariates in order to judge the appro-

¹ In order to evaluate the consistency of the scale within each subgroup, we also examined internal reliability for each. For members, $\alpha = .95$; for never-members, $\alpha = .94$; and for leavers, $\alpha = .92$.

TABLE 1
Means, Standard Deviations, and Significance Levels
Across Membership-Status Subgroups^a

Variables	Union Members (n = 150)	Nonmembers		F ^b	Cell Contrasts ^c
		Never-Members (n = 76)	Leavers (n = 58)		
Organizational tenure	3.65 (1.22)	3.75 (1.43)	4.38 (0.95)	7.55***	1-3 2-3
Job tenure	2.79 (1.22)	2.85 (1.48)	3.50 (1.25)	6.55**	1-3 2-3
Age	3.05 (1.27)	3.16 (1.30)	3.84 (1.12)	8.76***	1-3 2-3
Intrinsic satisfaction	3.88 (0.60)	3.94 (0.55)	3.81 (0.73)	0.68	
Extrinsic satisfaction	3.03 (0.86)	3.25 (0.83)	2.84 (0.98)	3.49*	2-3
Commitment to union	3.60 (0.86)	2.56 (0.81)	2.46 (0.77)	71.40***	1-3 1-2
Commitment to employer	3.65 (0.65)	3.73 (0.63)	3.41 (0.81)	4.42*	1-3 2-3

^a Standard deviations are in parentheses.

^b F-tests are from ANOVAs for the age, tenure, and satisfaction variables and from ANCOVAs for the commitment measures.

^c Results for specific cell contrasts that are significantly different, $p < .05$.

* $p < .05$

** $p < .01$

*** $p < .001$

TABLE 2
Zero-Order Correlations

Variables	1	2	3	4	5	6	7
1. Organizational tenure	—						
2. Job tenure	.66***	—					
3. Age	.66***	.55***	—				
4. Intrinsic satisfaction	.09	.02	.19***	—			
5. Extrinsic satisfaction	-.05	-.14*	.08	.68***	—		
6. Commitment to employer	-.09	-.14*	.11	.63***	.65***	—	
7. Commitment to union	.04	.03	.12*	.17**	.10	.22***	—

* $p < .05$

** $p < .01$

*** $p < .001$

priateness of a simple ANCOVA. None of the possible interactions were significant, thereby supporting their use as simple covariates.

The first two research questions concerned differences in the employer and union commitment scales across the three membership-status subgroups. The modest correlation between the two commitment measures ($r = .22$, $p <$

.001) supported the use of separate ANCOVAs on each measure to explore these differences. The ANCOVA on the union commitment measure produced a significant effect for membership status ($F_{2,278} = 71.40, p < .001$). Specific cell contrasts revealed that the mean level of union commitment for the members was significantly greater than that for the other subgroups, but that the means for the never-members and leaver subgroups were not significantly different. We also conducted an ANCOVA on the employer commitment measure that yielded a significant effect for membership status ($F_{2,278} = 4.42, p < .05$). Specific contrasts on the means of this measure revealed that employees who had left the union were significantly less committed to the employing organization than were members or those who had never been members. The means of the second two subgroups were not significantly different.

Prior studies have used a variety of operational definitions of dual commitment, including single specialized scales (Angle & Perry, 1984, 1986), split cross-tabulations of commitment scales (Purcell, 1953), and correlations between scales (Dalton & Todor, 1982; Fukami & Larson, 1982; Schriesheim & Tsui, 1980a, 1980b), and each definition has had a different yield. Our analysis focused on the interscale correlations, or the extent and direction of commitment congruency, across the three membership-status subgroups. In order to compare the results on the basis of membership status, we calculated the third-order correlations between the two commitment scales within each subgroup partialled for the age and tenure variables that differed across groups.² In contrast to the correlation of .22 between union and employer commitment for the whole sample, these subgroup correlations, displayed in Table 3, were .14 ($p < .05$) for members, .08 (n.s.) for never-members, and .48 ($p < .001$) for leavers. The modest correlation in the member subgroup could be partially attributed to common method variance, but because this source of covariance would occur across all subgroups, it would not affect a test of subgroup differences. Arnold's (1982: 152) suggested test for the difference among correlations showed that the correlations were significantly different ($\chi^2 = 6.07, df = 2, p < .05$), and a follow-up test failed to support a difference in the correlations between the member and never-member subgroups.

To examine the relationship between job satisfaction and commitment, we calculated the partial correlations between each type of commitment and the intrinsic and extrinsic satisfaction scales (Table 3). Consistent with the literature on organizational commitment, the correlations between both types of satisfaction and employee commitment were positive, significant, and large across all three subgroups. In contrast, the correlations between the satisfaction measures and union commitment were not positive for all subgroups and were significant only in the leaver subgroup. Arnold's test showed that the subgroup differences were marginally significant for the correlations between union commitment and intrinsic job satisfaction ($\chi^2 = 5.60, df = 2,$

² We tested differences in correlations across subgroups with the subgroup analysis procedures Arnold (1982, 1984) suggested.

TABLE 3
Selected Third-Order Correlations^a
Across Membership-Status Subgroups

Correlations	Union Members ^b	Nonmembers	
		Never-Members	Leavers
Commitment to union with commitment to employer	.14*	.08	.48***
Intrinsic satisfaction with commitment to employer	.54***	.58***	.81***
Extrinsic satisfaction with commitment to employer	.61***	.53***	.71***
Intrinsic satisfaction with commitment to union	.09	.02	.41***
Extrinsic satisfaction with commitment to union	-.06	.10	.53***

^a Correlations were partialled by age, organizational tenure, and job tenure to control for subgroup differences.

^b Union members, $n = 150$; never-members, $n = 76$; leavers, $n = 58$.

* $p < .05$

** $p < .01$

*** $p < .001$

$p < .10$) and highly significant for the correlations between union commitment and extrinsic job satisfaction ($\chi^2 = 14.35$, $df = 2$, $p < .001$). Follow-up tests showed that the contrast between the leaver subgroup and either of the other two subgroups caused these differences. When considered in combination with the pattern of subgroup means, these results indicate that (1) leavers experienced lower commitment to the union, lower commitment to the employer, and lower extrinsic job satisfaction than the other nonmembers, and (2) these three variables are reasonably interrelated for the leavers, but not for the other subgroups. These effects were independent of subgroups' differences on age and tenure.

DISCUSSION

The results of this study indicate that when membership in a representing union is voluntary, current and past membership status may be an important consideration in investigations of union commitment and the relationship between it and commitment to an employing organization. Different results characterized the three subgroups studied, even though a single union represented all three.

Implications for Research

The results demonstrate that union membership affects union commitment independently of the effects of union representation. The test of union commitment revealed a significant difference between members and nonmembers, but no differences between employees who had never been mem-

bers and those who had left the union. It would appear that limiting research populations to union members—rather than to the broader group of all employees represented by a union—overstates reported levels of union commitment. Simple conclusions about the extent of commitment congruence based on the correlation from bargaining unit members would also miss important differences among membership-status subgroups. Most notable are the findings pertaining to leavers that revealed a significantly different magnitude of the correlation between the two commitment measures and, when considered with reported means, showed leavers to be less committed to both the union and the employing organization. These results, combined with the differences between the never-member and leaver subgroups on both level of commitment to the employing organization and degree of commitment congruence, also suggest that a simple distinction between members and nonmembers in the same bargaining unit may mask differences in commitment among nonmembers based on prior membership status in a representing union. We obtained all of these differences while controlling for subgroup differences in age, job tenure, and organizational tenure. Interestingly, a second unique characteristic of the leaver subgroup was the significant correlation between union commitment and both of the satisfaction scales. Although there was no difference in levels of union commitment across the two nonmember subgroups, if we assume that at some point the leavers had a level of union commitment comparable to the members', the present data suggest that leavers may have adjusted their union commitment to enhance congruence between attitudes and actions. These results are also indicative of the union's "sharing the blame for conditions giving rise to job dissatisfaction" (Gordon et al., 1980: 426) within the leaver group; moreover, they imply that the leavers quit the union because of that blame. The absence of a positive correlation between union commitment and job satisfaction among the members also suggests that the union did not symmetrically share the credit for conditions giving rise to job satisfaction. Of course, only a longitudinal investigation can validly identify the processes leading to this pattern of results. The present data are merely suggestive.

Implications for Unions and Employers

The findings also have several possible implications for both the leaders of unions and the managements of employing organizations. It should be important to union leaders that levels of union commitment differ between union members and both subgroups of nonmembers because this finding suggests that union commitment depends on more than the negotiated benefits that accrue to all employees in jobs represented by a union. Even though all three subgroups received those benefits, the members had the greatest commitment to the union. It thus appears that unions' efforts to enhance commitment among nonmembers need to extend beyond the negotiation of agreements. Given the limited scope of bargaining afforded unions representing employees of the federal government, this implication should be viewed somewhat cautiously. Additional research should use other public and pri-

vate sector employees to investigate the generalizability of these findings to other union-management relationships.

Consistent with prior research, these findings support the contention that management should not view decisions to join or remain with a union as evidence of low commitment to an employer. Union members and those who had never been members held equivalent levels of commitment to the employer. But leavers were distinct from the other two groups in terms of both their lower level of commitment to the employing organization and the degree of congruence between the two commitment measures. Thus, we suggest that management should not necessarily interpret withdrawal from union membership as evidence of increased commitment to an employing organization.

Future Directions

Future research on union commitment needs to consider the distinctions concerning union membership status made in this report. Future assessments of union commitment conducted in settings in which union membership is voluntary should distinguish between respondents' actual and past union membership. Researchers should also give special consideration to situations in which union membership is mandatory as a condition of continued employment. In these settings, research efforts should assess the extent to which their inability to withdraw from the union without leaving the employing organization may influence union members' attitudes or perceptions.

Finally, future research should seek to identify the reasons why union members leave unions in voluntary contexts and how these reasons influence commitment to union and employing organization. Models of organizational exit or turnover may illuminate this issue.

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APPENDIX

Union commitment. These 11 items were adapted from the 15-item version of the Organizational Commitment Questionnaire (Porter et al., 1974); Dalton and Todor (1982) and Schriesheim and Tsui (1980a, 1980b) previously employed them in union contexts. Minor modification of some items was required to reflect this sample's inclusion of both members and nonmembers. All responses were on a 5-point scale, with 1 = strongly disagree and 5 = strongly agree.

1. I am willing to put in a great deal of effort beyond that normally expected in order to help this union be successful.

2. I feel very little loyalty to this union.
 3. Assuming I was a member of the union, I would help out with almost any type of internal union activity.
 4. This is a union I would be proud to tell others I am a part of.
 5. This union really inspires me to help out with internal union activities.
 6. Assuming I was a member of the union, it would take very little to get me to withdraw from membership in it.
 7. I am extremely glad that this union was chosen over others which could be representing me.
 8. There's not too much to be gained by belonging with this union indefinitely.
 9. Often, I find it difficult to agree with this union's policies on important matters relating to its members.
 10. I really care about the fate of this union.
 11. Staying or becoming a member of this union would be a definite mistake on my part.
- Items 2, 8, and 11 were reverse-scored.

Employee commitment. Excluding 4 items from the 15-item version of the Organizational Commitment Questionnaire (Porter et al., 1974), we used the 11 items from that questionnaire that paralleled the items in the union commitment measure.

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© Academy of Management Journal
1987, Vol. 30, No. 1, 162-173.

DEVELOPMENT AND VALIDATION OF A FORCED CHOICE SCALE TO MEASURE JOB-RELATED DISCOMFORT AMONG CUSTOMER SERVICE REPRESENTATIVES

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Previous investigations have established that workers' preferences or interests are related to voluntary termination (Mobley, 1982; Steers & Mowday, 1981). However, with the exception of the evidence on realistic job previews and weighted application blanks, there is little in the literature exploring turnover that has implications for actual decisions concerning personnel selection (Mobley, 1982). The evidence on inventories assessing motivation,

interest, or personality, for example, does not support their use for predicting voluntary termination of employees (Bernardin & Bownas, 1985; Wanous, 1980).

Numerous experimental studies have used motivational instruments to examine the compatibility of employees' needs or preferences with the characteristics of organizations. These compatibility indices are often statistically related to an outcome measure like voluntary termination. However, instruments like the Job Diagnostic Survey (Hackman & Oldham, 1974) and the Survey of Work Values (Wollack, Goodale, Wijting, & Smith, 1971) are transparent and, therefore, job applicants anxious to gain employment can easily fake responses to them. In general, transparent, nonverifiable instruments assessing motivation have little or no utility for actual employment decisions (Bernardin & Bownas, 1985; Guion, 1965; Wanous, 1980).

One of the problems common to both realistic job previews and standardized instruments assessing personality or motivation is that strong motivation to obtain a job may offset negative emotion regarding the job content itself. The dominant theoretical explanation for why realistic job previews work is that they allow individuals to self-select out of jobs that do not satisfy their needs (Breaugh & Billings, 1986). However, for situations in which applicants are highly motivated to obtain any job, the self-selection process may never occur. Desperate job seekers might ignore negative emotion that anticipation of the job content fosters because of the positive emotion that the idea of simply obtaining a job engenders. Deliberate distortion of responses is one of the most serious problems in the use of instruments measuring personality, motivation, or job preference for employment decisions (Bernardin & Bownas, 1985). In order to obtain employment, applicants may complete such instruments with their conception of the most desirable answers from the employer's perspective in mind. Later, other job opportunities may develop, and negative emotion regarding characteristics of a job could foster voluntary termination (Mobley, 1977).

Forced choice methodology was developed to control or eliminate deliberate faking of responses. When properly developed, such instruments result in higher validities than other formats for real employment decisions (Bernardin & Beatty, 1984: 190). However, there have been few applications of the forced choice methodology outside of performance appraisal and clinically oriented tests of personality or motivation like the Sixteen Personality Factors Questionnaire (16PF) (Cattell, Eber, & Tatsuoka, 1970). The nature of such instruments limits their predictive validity in specific job situations; magnitudes of these validities could certainly be improved (Bernardin & Bownas, 1985). A potentially useful strategy might be to employ the forced choice methodology with behavioral situations relevant to a specific job. Job analysis could identify key components of the job that foster significant negative affect or discomfort. Representatives of the applicant population could then rate both these behavioral or situational items and other discomforting items not germane to the job under study on degree of discomfort or negative emotion. Investigators could then group items according to degree

of discomfort to develop a forced choice format and key discomforting items describing characteristics of the actual job as the valid forced choice items—those hypothesized to predict voluntary termination. The hidden scoring key of this approach should thus reduce or eliminate the effects of deliberate rating distortion. Karren and Hannan (1986) used a similar methodology in developing of a job characteristics questionnaire for a law enforcement job. Scores on the questionnaire were significantly related to completion of a training program.

This methodology would be particularly useful for jobs with high rates of voluntary termination and a number of negative characteristics that, for one reason or another, organizations cannot improve. One such job is that of customer service representative for a newspaper or periodical. Rates of voluntary termination are relatively high throughout the industry for representatives primarily responsible for communicating with complaining customers. Thus, I chose this job for the present study.

The purposes of this research were (1) to develop a forced choice scale for measuring discomfort based on the characteristics of this specific job, and (2) to assess the correlations between responses on this scale and voluntary termination for customer service representatives. Specifically, I hypothesized that the higher their scores on the forced choice discomfort scale, the higher the probability that employees will voluntarily terminate employment. In addition, I assessed the relative validity of two other screening devices, a weighted application blank and a standardized personality instrument.

METHODS

Participants

All part-time customer service representatives from a large Florida newspaper were asked to participate in the study. Their major responsibility was to talk with customers on the telephone regarding accounts and delivery problems with the newspaper. A total of 43 part-time representatives, 91 percent of the relevant workforce, provided usable data. The starting pay for the job was \$5.65 per hour, and the work week was 30 hours. The participants' average age was 22 years (*s.d.* = 13); 14 of the 43 participants were part- or full-time college students.

All incumbent participants completed the instruments on the same day. The data collection was part of a larger project designed to reduce employee turnover, which had been 120 percent in the previous year. The project included development of a weighted application blank and a realistic job preview. Actual applicants for a part-time job as customer service representative also completed the instruments (*n* = 21).

Development of the Discomfort Scale

A job analysis was conducted to identify sources of discomfort involving characteristics of the job. I and three other job analysts gathered information through hour-long interviews with ten customer service representatives and

four supervisors as well as through site visits; one analyst actually performed the job briefly. It appeared that customer complaints—nondelivery of the paper, a paper thrown into a puddle or through a window, or billing errors—almost entirely consumed the representatives' time, although job specifications included typing skills of 35 words a minute and some computer terminal experience. Through the interviews with incumbents, observation, and participation, we identified the following job characteristics as particularly discomfoting. (1) The work schedule consisted of five-hour shifts, six days per week. Working on both Saturday and Sunday from 7:00 A.M. to 1:00 P.M. was mandatory for all employees. (2) The work involved sitting for considerable periods of time and talking with customers on the telephone. A group of incumbents judged approximately 75 percent of the calling customers to be "irate or angry." (3) Supervisors, who were required to monitor a sample of the calls each customer service representative took each day, frequently interrupted representatives and exercised their authority. (4) The work environment was hectic and noisy. (5) Movement was restricted and privacy limited.

Once the areas of potential discomfort had been identified through this analysis, eight job analysts wrote statements describing similar, potentially discomfoting situations that were not obviously drawn from this particular job. This step was necessary to hide the ultimate scoring key from job applicants and thus limit or eliminate deliberate distortion of ratings. These statements were the valid items of the scale; that is, I hypothesized that respondents who selected these items as more discomfoting than other items were likely to quit their jobs. Analysts also wrote statements that described discomfoting situations completely irrelevant to the job. Designing a forced choice instrument requires grouping the keyed or valid items with dummy or invalid items of equal levels of discomfort. Altogether, the potentially relevant—or valid—and irrelevant statements numbered 85.

A group of 40 students from a class in personnel administration, who had no other involvement in the project, rated the discomfort level of each statement. I employed students for this task because many of the applicants for the job were also students. Raters answered the question "To what extent does each statement describe an aggravating or discomfoting situation for you?" on a six point scale from (a) not at all to (e) to a very great extent.

Drawing on previous research with forced choice formats (Berkshire & Highland, 1953), I chose a tetradic response format consisting of two valid and two invalid items. With such a format, respondents must select two—and only two—items as the most discomfoting. I grouped items in tetrads so that all statements within a tetrad were at equivalent levels of discomfort, which meant that all mean ratings on discomfort were within one standard error. The Appendix presents the complete scale.

Unanimous selection by the job analysts and four job incumbents determined choices of the valid items. The final scale consisted of 20 tetrads with two keyed or valid responses for each tetrad. Thus, the possible range in

scores was 0 to 40, with high scores representing high levels of discomfort for job-relevant situations.

Additional Instruments

Two other instruments were tested for their ability to predict voluntary termination. I selected the Sixteen Personality Factor Questionnaire (16PF) (Cattell et al., 1970) because earlier research has found a significant correlation between scores on some of its factors and organizational withdrawal. I chose the weighted application blank because of its proven ability to predict voluntary termination (Cascio, 1986: 189).

Because the population studied was small, only three 16PF factors were examined; past research was the basis of selection of the three (Bernardin, 1977). In addition, following a recommendation for small samples (Hogan, Carpenter, Briggs, & Hanssen, 1985), I derived a composite measure based on six of the factors. The factors selected for individual study were instability, anxiety, and conscientiousness. The unit-weighted composite measure included sizothymia,¹ instability, conscientiousness, social awareness, self-assurance, and anxiety. Past research with the 16PF and the results of the job analysis were the bases for selecting these factors (Bernardin, 1985).

A previous study using standard regression procedures (Bernardin, 1985) developed and validated the weighted application blank. Significant ($p < .10$) positive and negative predictors of voluntary termination were an applicant's age, desire for full- or part-time work, referral by an employee of the company, having relatives working for the company, a previous salary lower than the starting salary, and intention to continue in school. Again, because of the small population, I derived a composite measure for each participant based on unit weights of responses on the application that I had found to be valid in my previous (1985) study, in which complete details on the development of the work application blank appear.

Measures of Voluntary Termination

The study included measures of both intentions to leave and voluntary termination. The following question measured intentions: "Indicate the likelihood that you will quit this job some time in the next year," scaled from (a) very unlikely to (e) certain. Previous research (Mowday, Koberg, & McArthur, 1984) has shown this question to correlate with actual turnover. A record of voluntary terminations during the nine months following completion of the questionnaires revealed that 29 of the participants had quit by the end of the period, a turnover rate comparable to those reported for this job in previous periods.

Procedures

The customer service representatives completed the discomfort scale and the intentions scale on work time, along with form C of the 16PF. I asked

¹ Sizothymia describes a person who is reserved, detached, critical, aloof, and stiff.

incumbents to complete the discomfort scale and the 16PF as if they were applying for the job and really needed the work. Confidentiality of responses was stressed, and personal identification was optional. All participants signed their names on the questionnaire after receiving a briefing on the purpose of the study. I retrieved application blanks for the 43 participants from personnel files and scored them according to the unit-weighted system validated in my previous study with independent data.²

RESULTS AND DISCUSSION

Table 1 presents the means, standard deviations, and intercorrelations for the discomfort scale, the factors from the 16PF, the composite work application blank score, and the two criterion measures. Data are presented for both incumbents and applicants. As in previous studies, and in support of the response weights previously determined, the work application blank was significantly correlated with voluntary termination ($r = .28$, $df = 43$, $p < .05$) of incumbents.

The relationship between scores on the discomfort scale and the two measures of voluntary termination were also significant and in the predicted direction ($r = -.39$, $p < .05$ for intentions; $r = .31$, $p < .05$ for voluntary termination). Only one of the personality factors, sizothymia, was significantly correlated with intention ($p < .05$), and none of the factors nor the composite was significantly related to voluntary termination. The multiple correlation of the work application blank and the discomfort scale with voluntary termination was also significant ($R = .43$, $df = 41$, $p < .05$).

One possible drawback to this study was the use of a validation design employing incumbents. The assertion that measures of personality or motivation are sufficiently transparent that job applicants will simply distort responses in order to get a job is common. Current employees who are asked to complete such instruments, however, have no such motivation, since they are already employed. Thus, the extent to which validation with incumbents can generalize to an applicant population is questionable. However, subsequent testing with the discomfort scale revealed slightly lower, but not significantly different, mean scores on the instrument for 21 new job applicants compared to incumbents (mean = 24.1, s.d. = 5.7). Thus, response set differences, a problem generally attributed to concurrent designs for personality measurement and manifested in different distributions of responses (Guion, 1965), did not seem to arise in this situation. The nontransparent format of the forced choice instrument appeared to effectively hide the scoring key and thus control deliberate response bias for this applicant population. Incumbents' work experience was also apparently not a confounding factor, given that the mean scores for incumbents were not significantly different

² For example, if employees were over 25 years of age, they received two points; if an employee of the company had referred them, another point; if they desired part-time work, an additional point; and so forth. A composite was thus formed for each folder, with scores ranging from 0 to 14.

TABLE 1
Means,^a Standard Deviations, and Intercorrelations^b
of Predictors and Criteria

Variables	Means		Standard Deviations		2	3	4	5	6	7	8	9	10	11
	Incumbents	Applicants	Incumbents	Applicants										
1. Sizothymia	6.1	6.5	1.8	1.9	.36	.21	-.13	-.21	-.11	.64	-.13	-.41	.27	.18
2. Instability	6.6	6.2	1.9	1.4		.39	-.20	-.29	-.38	.58	-.12	.23	.04	.11
3. Conscientiousness	6.9	7.2	1.6	0.9			.04	-.24	-.41	.50	.29	.14	-.16	-.02
4. Social awareness	5.5	6.3	1.9	1.5				.13	.02	.32	.14	-.09	-.02	.09
5. Self-assurance	5.3	5.2	2.0	2.3					-.36	-.45	-.30	-.07	-.04	.14
6. Anxiety	4.8	4.3	1.8	1.0						-.61	.24	.30	.20	-.03
7. 16PF composite	15.2	16.8	6.8	8.9							.09	.08	-.08	.12
8. Work application blank (WAB)	9.1	5.6	2.5	2.0								-.21	.21	.28
9. Discomfort scale	25.5	24.1	5.6	5.7									-.39	-.31
10. Intentions	2.7		1.6											.55
11. Termination	0.7		0.5											

^aFor incumbents, $n = 43$; for applicants, $n = 21$.

^bIntercorrelations are for incumbents only; $p \leq .05$ where $r \geq .25$, one-tailed test.

from the job applicants'. The results of this study cannot support conjectures as to the extent to which such a methodology can control deliberate response distortion in other contexts—for instance, among applicants with higher aptitudes, more experience in testing, or greater motivation to distort.

Also noteworthy was the response pattern for incumbents and job applicants on the 16PF. When asked to play the role of job applicants motivated to gain employment, incumbents made responses that resulted in factor scores significantly higher ($p < .05$) than published norms (Cattell et al., 1970). Job applicants' scores on all factors under study were also elevated, and no significant mean differences emerged between applicants and incumbents on any of the factors.

It should also be noted that the response weights for the work application blank were derived empirically from a previous study involving the personnel records of 77 employees (Bernardin, 1985), but the scoring key for the discomfort scale in this study was theoretically derived from the results of the job analysis. Given a large population, it would be possible to derive empirically determined item weights with a forced choice instrument. Of course, the extent to which an empirical weighting system would prove to be more valid than a theoretical approach is unknown. Clearly, however, the approach described in this study is far more practical for and applicable to organizations, given the large populations required for empirical analysis of items.

Further research with this methodology employing both job characteristics and forced choices is needed to test its generalizability. Although the focus of this study was on negative job characteristics, investigators could develop situationally keyed, forced choice instrumentation to tap positive emotions related to a job as well. For this particular job, both the turnover rate and the job analysis suggested that negative emotions were prepotent. In fact, when incumbents were asked to indicate what they liked the most about the job, the most common response was "nothing" or "leaving." The use of job analysis to identify both negative and positive aspects of a job and the construction of a forced choice instrument based on these results may be useful for such other types of work with high turnover as nursing, law enforcement, and military service.

This methodology does not preclude job redesign interventions targeted at major sources of discomfort for a majority of workers. Investigators could apply cost-accounting procedures to determine the most economically beneficial approaches to dealing with high rates of voluntary termination (e.g., Cascio, 1982) and could then compare approaches for costs of development and implementation relative to their effects on employees' terminations and other outcome measures.

As in previous research, a job-specific scoring key proved to be more effective in predicting voluntary termination than standardized scoring keys. However, attempts to develop tailored keys for standardized personality instruments have generally not been successful (Hogan et al., 1985). The

weighted composite scoring key for the 16PF developed in this study did not predict intentions to quit or voluntary termination in this organization.

The newspaper studied now includes the discomfort scale in the application package that job applicants complete. Applicants are only aware of the general nature of the job when they complete the scale. The organization has implemented a multiple-hurdle selection system in which scores on the weighted application blank and the discomfort scale eliminate a number of applicants. It has also developed a realistic job preview and installed it as a final hurdle. The turnover rate in the six months after implementation of this full program was significantly lower than in any of the previous four 6-month periods;³ there were no major changes in the job's characteristics or the compensation package, and the area's unemployment rate decreased slightly. This successful reduction in voluntary terminations makes further empirical validation of the instruments infeasible at this time.

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³ The turnover rate for the employees who were hired using the new program was 24 percent compared to rates of 59, 68, 49, and 73 percent for the four previous 6-month periods. The post-intervention rate was significantly lower than pre-intervention rate ($p < .05$), determined by using z statistics.

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APPENDIX

Discomfort Scale

For each of the 20 sets of four situations listed, respondents were asked to circle the letters of the two situations—and only two—that would cause them the most aggravation or discomfort. Valid items are indicated with a (v).

1. a. You are shopping, can't find what you want and there isn't a salesperson in sight.
b. You can't go out and party on weekends. (v)
c. Having to listen to someone's point of view with which you disagree. (v)
d. It rains the day you scheduled a picnic at the beach.
2. a. You must be indoors on a sunny day. (v)
b. You are stood up for an appointment.
c. You hear your neighbors argue. (v)
d. You are the only employee to forget to get the boss a birthday card.
3. a. You are in an eight item express lane at the grocery and the person in front of you has 14 items.
b. You have a long wait in a line before your number is called.
c. Your boss yells at you about another person's mistake. (v)
d. You have an 11:00 P.M. curfew on weekends. (v)
4. a. You are ill and have to miss work. You are docked for the time you missed. (v)
b. A friend borrows something of yours and does not return it.
c. You must get up at 6:00 A.M. to go to work. (v)
d. The expressway is bumper to bumper and you are late for work.
5. a. You go to a theater and find the movie is sold out.
b. You are required to work in a crowded, noisy room with no privacy. (v)
c. Your work is closely monitored. (v)
d. You are required to work in a room by yourself.
6. a. You are driving down the highway; someone cuts in front of you with only inches to spare.
b. You work with someone who frequently uses obscenities. (v)
c. Waiting at a railroad crossing for a long freight train.
d. You have to repeat instructions several times. (v)
7. a. You have to be polite to a rude person. (v)
b. Your charge account bill includes charges you did not make.
c. Someone tries to tell you how to do something you know how to do very well.
d. Circumstances require you to be indoors when you had scheduled a trip to the beach. (v)

8. a. Your schedule for work or school changes from day to day. (v)
b. You are inside watching television all day. (v)
c. You buy a new television and it goes on sale the next week.
d. You have a project the boss needs for a 3:00 P.M. meeting and you can't get it finished.
9. a. You have an argument with a close friend.
b. Talking on the phone for several hours at a time. (v)
c. The 10:30 A.M. scheduled delivery of your new bed arrives at 4:00 P.M.
d. Someone strongly disagrees with you. (v)
10. a. Someone brings a crying baby to the movie you are attending.
b. Being in a windowless room for several hours. (v)
c. A person speaks angrily to you. (v)
d. You work closely with someone who doesn't have a sense of humor.
11. a. Shopping in a crowded mall on December 24th.
b. You buy lunch at a drive-through window and find part of the order missing when you get home.
c. It rains on your day off. (v)
d. Being blamed for something you did not do. (v)
12. a. You miss a special party because you must work for a co-worker who calls in sick.
b. Being yelled at and called names. (v)
c. A day brings you one problem to solve right after another. (v)
d. There is only one cashier on duty at the grocery store and the person in front of you has a \$300 order.
13. a. Your assignment is to settle a problem between two feuding co-workers. (v)
b. The party you are attending gets loud and rowdy.
c. The show you are watching on television is interrupted for a news bulletin just as they are about to reveal the murderer.
d. A co-worker complains constantly about working conditions, but won't speak up to the supervisor. (v)
14. a. Your car doesn't start as you leave to go home; you left the lights on.
b. You must be pleasant to people who are rude. (v)
c. You have planned a vacation and the boss cancels it due to an emergency project that must be completed.
d. Sitting for more than an hour at a time. (v)
15. a. You are required to correct the errors/mistakes of another employee. (v)
b. Someone angrily disagrees with you. (v)
c. Getting out of bed on a cold, rainy morning.
d. You wait for someone to pull out of a parking place and someone else pulls in the space ahead of you.
16. a. A co-worker complains about the work schedule but won't speak up to the boss.
b. Talking on the phone to strangers. (v)
c. You leave work at 9:00 P.M. and must be back on the job at 7:00 A.M. the next morning. (v)
d. Your stereo quits the day it is finally delivered from the store.
17. a. You are required to work in a room with a lot of noise. (v)
b. A co-worker leaves most of the work for you, but still gets the credit. (v)
c. A phone rings and rings, but no one answers it.
d. Waiting for a drawbridge.
18. a. You try to settle a problem for someone, and he/she doesn't like any of your suggested solutions. (v)
b. You have to get up early on Saturday and Sunday mornings. (v)
c. A co-worker always has a "better" way for you to do something you have already done.
d. Your roommate is forever leaving things scattered all about the apartment.
19. a. Your job requires you to do the same task over and over again. (v)
b. You wait your turn in line and someone cuts ahead of you.
c. You accidentally cut someone off in traffic and the person starts to yell at you and call you obscene names. (v)
d. Your Sunday newspaper never arrives.

20. a. A friend asks your advice and becomes angry when you give it. (v)
b. You are obligated to be nice to a rude guest in your home. (v)
c. A co-worker leaves early and you must complete the work alone.
d. You must miss religious services on a regular basis.

John Bernardin earned his Ph.D. degree in psychology at Bowling Green State University. He is a professor of management and Director of Research for the College of Business and Public Administration at Florida Atlantic University. His research interests include psychological assessment and performance appraisal.

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ARTICLES

Submit five copies of the manuscript; be sure that they are good, clear copies and that all pages are included in each copy. The manuscript should be typed on standard size (8½" × 11") paper, *double-spaced throughout* (including footnotes, references, quotations, and appendices), on only one side of the paper, and with wide margins (one inch or more) at top, bottom, and both sides of each page. Manuscripts prepared on computers should be printed on letter quality printers or, if other printers are used, in double-strike or enhanced print. Footnotes, references, appendices, tables, and figures should be on separate sheets of paper and should be arranged at the end of the manuscript in the order listed in this sentence. There is no absolute limit, but the length of articles should not ordinarily exceed 30 manuscript pages, including references, appendices, tables, and figures.

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RESEARCH DESIGN

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Firms in Sample

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FIGURE 1
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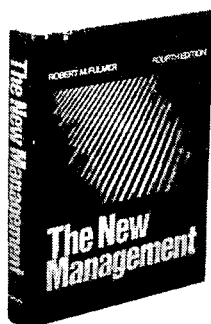
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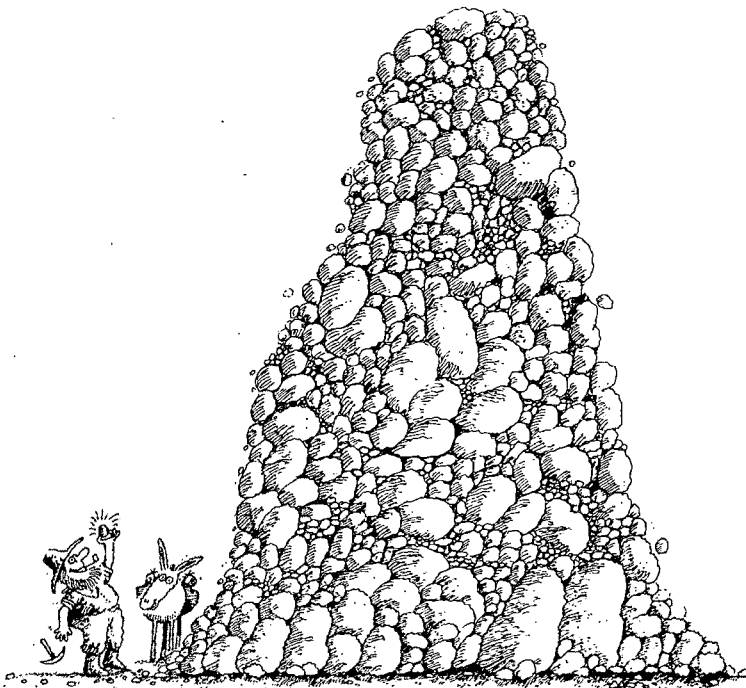
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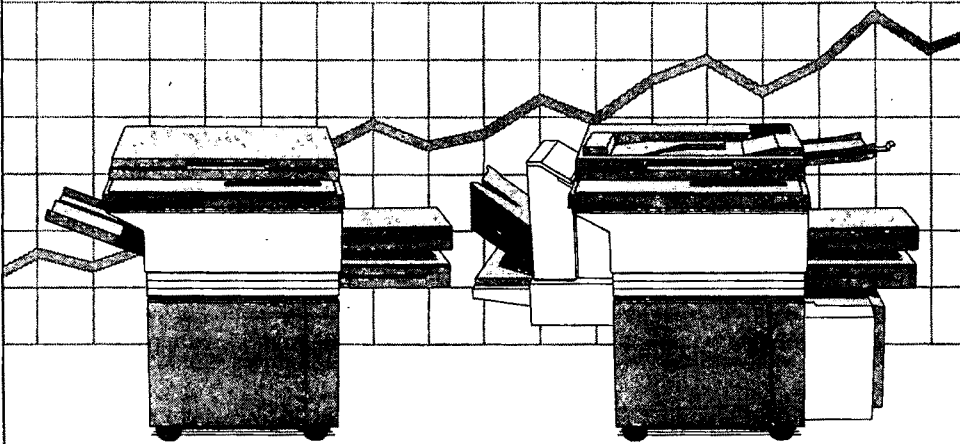
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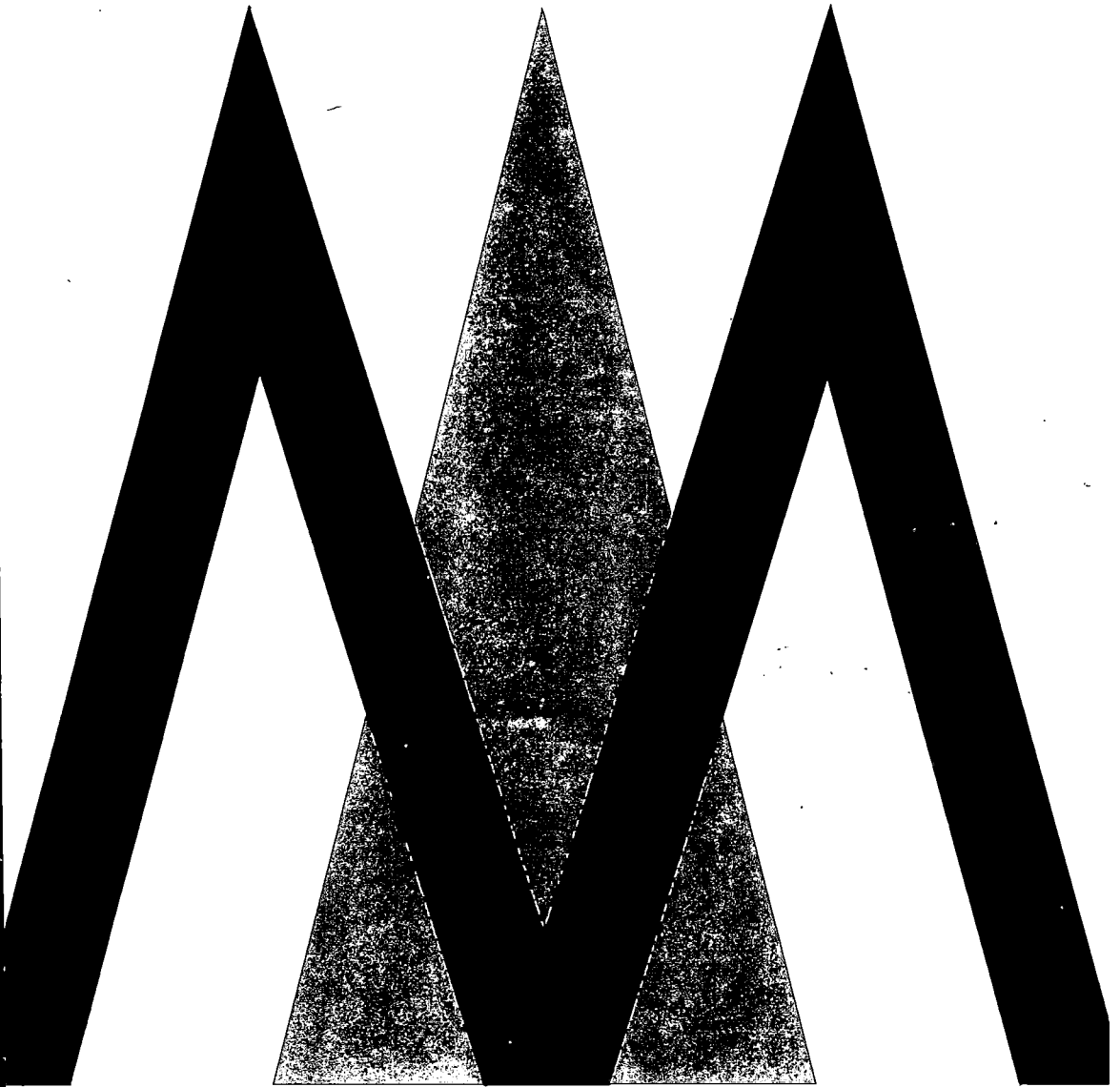
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NUMBER 2

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Typesetting by Repro Services, Inc., Decatur, Georgia; presswork, binding, and mailing by Darby Printing Company, Atlanta, Georgia.

Academy of Management Journal, Publication No. 900920.

Second class postage paid at Atlanta, GA, and additional mailing offices.

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ISSN, 0001-4273

ORGANIZATION-CLIENT TRANSACTIONS AND ORGANIZATIONAL GOVERNANCE STRUCTURES

GARETH R. JONES
Texas A&M University

Transaction cost theory was applied to an examination of how the characteristics of transactions between organizations and their clients affect internal organizational governance structures. The study assessed the effect of transaction costs on forms of organizational structure and control through two transaction characteristics, transaction uncertainty and performance ambiguity. The results suggest that when transaction uncertainty and performance ambiguity are high, organizations tend to be small and highly specialized and to adopt complex forms of task interdependence and employee control systems.

Few empirical investigations have looked at the way in which the characteristics of inputs from task environments influence organizational structure and control (Argote, 1982; Comstock & Scott, 1977). Most research has focused on characteristics of the conversion or throughput stages of work processes and has assessed the effects of these characteristics on organizational coordination (Hickson, Pugh, & Pheysey, 1969; Van de Ven, Delbecq, & Koenig, 1976; Woodward, 1965). Although such research has yielded consistent results (Fry, 1982), recent studies on the technology of hospital organizations (Argote, 1982; Overton, Schneck, & Hazlett, 1977) have suggested that inputs in task environments also affect organizational coordination and control because clients are among the main sources of uncertainty for these organizations. When clients are close to an organizational boundary—or within an organization—the latter has to control the uncertainty associated with its relationships with them.

This study had two purposes. The first was to use transaction cost theory to examine how the characteristics of transactions between clients and organizations create uncertainty for the latter. The second was to explain how different kinds of transactions result in the use of different forms of structural and control mechanisms inside organizations. In other words, this research investigated the proposition that the nature of transactions between clients and organizations at their organizational boundaries may in part explain the forms of their internal governance structures.

Transaction cost theory is useful in dealing with this issue because its central aim is to explain how the characteristics of a transaction between two

I am grateful to the reviewers for their many valuable comments on earlier drafts of this paper.

parties lead to the use of different governance mechanisms for managing the transaction. For example, transaction cost theory explains the decisions of firms to integrate vertically (Armour & Teece, 1978; Walker & Weber, 1984) or to form divisions (Monteverde & Teece, 1982) in terms of the relative costs of hierarchical versus market exchange. In typical treatments of transaction cost theory the parties to exchange are organizations, but this perspective can also apply to individual transactions between clients and organizations. When such transactions are the focus of analysis, however, there is one important proviso: hierarchy is not always feasible or efficient because clients will not always be willing to enter into the sort of formal, long-term relationships with an organization that grant it authority. Consequently, I examined how the nature of an organization's internal governance mechanism—its specific structure and control system—is one possible consequence of its need to manage the transfer of goods and services when the *internalization of a client relationship within an organization is not a feasible alternative*.¹ Although only transactions with clients are considered, this theory may also be applicable to other stakeholders in organizational task environments, such as financial supporters, suppliers, or labor unions.

In this study, organizational task environments are conceptualized as sets of individuals or clients with whom organizations engage in transactions. My central argument is that the characteristics of different kinds of client-organization transactions systematically affect organizational structure and control because organizations achieve efficiency when they manage transactions between clients and themselves so as to economize on transaction costs. One way they can do so is by choosing internal governance mechanisms that reduce the uncertainty surrounding transactions.

MANAGING ORGANIZATIONAL BOUNDARIES: A TRANSACTION COST APPROACH

Thompson (1962, 1967) recognized the importance of managing transactions between organizations and their clients in his central thesis: "Under norms of rationality organizations seek to buffer environmental influences by surrounding their technical cores with input and output components" (1967: 20). From this perspective, the principal issue facing organizations is managing the exchange process across organizational boundaries. Indeed, Thompson (1962) described this exchange process as a transaction, arguing that organizations can manage the uncertainty surrounding transactions with

¹ Another possible way to manage this exchange is through the development of informal contracts between clients and organizations, such as through the use of warranties, guarantees, or the development of relational exchange (MacNeil, 1974). Another work (Bowen & Jones, 1986) discusses these issues, which are not part of the present argument with its specific focus on the effects of transactions on internal organizational governance structures.

their clients in one of two ways.² The first involves detaching an organization's technical core from its task environment in order to reduce uncertainty. Thompson (1967) suggested several methods for simplifying or rationalizing clients' demands in order to protect a technical core, including buffering, smoothing, and rationing transactions. The second way of managing uncertainty involves altering the level of employees' task interdependence to respond to clients' demands. Organizations may adopt pooled, sequential, or reciprocal forms of task interdependence, depending on the level of transactional uncertainty.

Although Thompson did not address the issue, the alternative an organization selects and, more generally, the type of governance mechanism that emerges for managing transactions may be functions of the characteristics of the transactions between clients and organization. The utility of strategies for managing uncertainty may depend on the nature of the transactions in which a firm is engaged. In this connection, transaction cost theory becomes directly relevant to understanding how the transactions between organizations and clients lead to the emergence of specific forms of internal governance structures.

Transaction cost theory also defines a transaction as the transfer or exchange of goods and services across an organizational boundary (Williamson, 1975, 1979). Transaction costs are the costs involved in negotiating, monitoring, and enforcing exchange between parties. The purpose of transaction cost theory is to identify the sources of transaction costs—those characteristics or dimensions of a transaction that make exchange problematic or prohibitively expensive—and then to specify the governance mechanism that can most efficiently handle the transaction so as to economize on these costs. In Williamson's (1975) model, transaction costs arise because a transfer of goods and services takes place in an exchange context where information is imperfect, where parties have made asset-specific investments, or where either party may seek to promote its own interests at the expense of the other by engaging in strategic or opportunistic behavior. Such factors as a small number of suppliers or buyers or a high level of uncertainty surrounding an exchange process increase the costs of transferring or exchanging goods and services because they make opportunistic behavior likely and ensuring equity difficult. Specifically, the coupling of human factors like bounded rationality with environmental factors like uncertainty affects the costs of negotiating, monitoring, and enforcing exchange between parties. To apply transaction cost theory to transactions between organizations and clients, it is first necessary to identify which characteristics of such transactions will lead to transaction costs.

² Thompson's view of a transaction was this: "Each output role, together with the reciprocating non-member role can be considered as built into a transaction structure. Because output roles exist in structures that span the boundaries of the organizations, they may be important sources of adaptation to environmental influences" (1962: 309).

Characteristics of Client-Organization Transactions

In order for a transaction to take place, both parties must benefit from it. Economizing on transaction costs increases the joint benefits parties receive from a transaction. Thus, the objectives of examining client-organization exchanges from a transaction cost perspective are to isolate those characteristics of a transaction that lead to costs and then to specify the organizational governance mechanism that can be used to economize on these costs. Two transaction characteristics, transaction uncertainty and performance ambiguity, account for the levels of negotiating, monitoring, and enforcement costs in transactions between clients and organizations. Both these characteristics affect the amount of information that has to be processed to complete such transactions. Transaction uncertainty represents those elements leading to costs for the organization involved in a transaction. Performance ambiguity (Ouchi, 1980) represents those elements leading to transaction costs experienced by clients.

Transaction Uncertainty

Transaction uncertainty exists to the degree that organization-client transactions are unstandardized or unpredictable. The greater the level of such uncertainty, the greater the amount of information that an organization has to process to complete transactions efficiently, and thus the higher are its costs. Three dimensions of transactions produce the level of transaction uncertainty organizations experience: (1) specificity, (2) infrequency, and (3) duration. These three dimensions seem a priori to encapsulate the observable features of transactions. I derived the first two from Williamson's (1979) discussion of the origin of transaction costs and developed the third for this study. Collectively, these dimensions define transaction uncertainty, measured empirically as an additive function of the three of them.

First, level of transaction uncertainty is a function of transaction specificity, or the degree to which one party has made a transaction-specific investment with the other party. This investment may, for example, take the form of the history of an organization's involvement with a particular client or set of clients. Also, if an organization contracts to satisfy a unique customer's need—architects building a custom home is an example—the parties have made a specific investment. In these situations, organizations must gear their production to suit the needs of particular clients and devote resources to maintaining the exchange relationship. Making client-specific investments increases transaction uncertainty and therefore the transaction costs that have to be incurred as organizations collect the information and knowledge necessary to manage an exchange relationship and guard against opportunism (Williamson, 1979). Conversely, when exchange specificity is low, as when organizations supply standardized goods or services to anonymous clients, the costs of negotiating, monitoring, or enforcing exchange relationships will also be low because the price mechanism alone can handle the costs of managing transactions. In such situations, organizations need not bear the costs of developing intimate knowledge of their clients.

Second, level of transaction uncertainty is a function of transaction infrequency, or how often organization-client transactions occur. The more frequent or recurring the exchange between a client and an organization, the lower the uncertainty and costs of transactions. This is because when exchange is frequent, the parties to transactions become used to dealing with one another and rely on past experience (Williamson, 1975). As a result, opportunism is unlikely to be a major concern. However, the more infrequent the exchange, the higher the level of transaction costs, because clients' demands are unpredictable, and the costs of negotiating and policing are consequently high.

Lastly, transaction duration, or the amount of time necessary to complete a transaction between a client and organization, also affects transaction uncertainty. For example, when it is very difficult for clients to evaluate the quality of an organization's outputs, or when extensive face-to-face interaction between client and organization is required, transactions will last a long time. Consequently, transaction costs will be high because the parties must exchange much information and knowledge to complete transactions. Conversely, when a transaction is instantaneous or requires only minimal involvement with clients, there will be few problems in negotiating or monitoring the exchange relationship. Point-of-sale merchandising is an example.

Thus, the first way in which the nature of transactions affects transaction costs at organizational boundaries is the extent to which specificity, infrequency, and duration affect the level of transaction uncertainty. In general, the more infrequently transactions occur, the longer their duration, and the more specific they are to the demands of particular clients, the higher the uncertainty and costs. Conversely, when firms supply homogeneous goods or services to anonymous clients and transactions are short-term and recur regularly, transaction uncertainty will be low.

Performance Ambiguity

As noted, in order for transactions to take place, clients must perceive themselves benefiting from them. Several dimensions of client-organization transactions affect the degree of performance ambiguity present in an exchange relationship (Ouchi, 1980). Performance ambiguity refers to clients' ability to monitor and evaluate the performance of the other parties and to determine the value of the objects of exchange.

First, it is often difficult for clients to monitor and evaluate the quality of goods or services when these are intangible—like medical advice—or are produced and consumed simultaneously (Mills & Moberg, 1982). Second, the quality of many products and services depends on the skills and abilities of specialized personnel, such as doctors or lawyers, whose very specialization often makes it difficult for clients to evaluate their performance. Similarly, when a great deal of service accompanies the purchase of a product—for example, the installation and programming of a computer—it may be difficult to estimate the value of what is provided. In these situations, performance ambiguity is present because the parties to the transactions have differential

knowledge or information about the time or resources necessary to produce the product or different abilities to evaluate the outputs (Bowen & Jones, 1986). Customers buying works of art or governments monitoring weapons contractors are further examples of situations in which clients are at an information disadvantage relative to suppliers.

Under such conditions, clients may perceive high uncertainty and risk in the exchange process. Consequently, transaction costs are high because both organizations and clients—but in particular the clients—have to bear the information costs of ensuring equity in the exchange relationship. For example, clients are forced to bear the search costs of shopping around to ensure that terms of trade are acceptable. They also incur information costs as they collect the data necessary to make the best decision. Lastly, they bear the monitoring costs of evaluating the quality of the product or service they receive, often bearing these costs after making a purchase. Conversely, if performance ambiguity is low, transaction costs are also low because it is easy for clients to monitor and evaluate the service they receive. This would be the case when goods are homogeneous and clients' involvement in an exchange is confined to a simple decision to buy. Under these conditions, clients are often in a position to bear a part of an organization's monitoring burden because they can evaluate employees' behavior. For example, it is difficult for employees to shirk when a line of clients is waiting to be served since the employees' performance is very visible to the clients, whose presence puts psychological pressure on the employees to perform. These situations reduce the transaction costs organizations experience and affect the governance structures they select.

STRUCTURE, CONTROL, AND TRANSACTIONS

Transaction uncertainty and performance ambiguity affect levels of transaction costs at organizational boundaries. How then do these variables influence the nature of organizational coordination and control as firms and clients attempt to economize on these costs?

When transaction uncertainty and performance ambiguity are low, organizations have few problems in coordinating exchange relationships because clients have little difficulty in evaluating the quality of the goods and services they buy; transactions are standardized and clients are anonymous. Under these conditions, the costs of negotiating, monitoring, and enforcement are minimal, and organizations can economize by instituting procedures that reduce levels of interaction between themselves and clients. Specifically, price is likely to emerge as the principal governance mechanism, and the existence of a competitive market will be sufficient to reassure both parties that the terms of exchange are equitable. Organizations are likely to offer a bundle of price and quality options to attract clients, who are likely to select the one that offers the best quality products at the lowest available prices (Bowen & Jones, 1986).

Also, when transactions are standardized, employees' behavior is very visible, and consequently the risk of agent opportunism, or shirking, is low

(Jones, 1984). The loss of control that can occur when a principal, like an organization, delegates authority to an agent, like an employee, is at a minimum because the principal can easily monitor the agent's behavior (Eisenhardt, 1985; Jensen & Meckling, 1976). Consequently, the transaction costs of hierarchical exchange will also be low.³

When transaction uncertainty is high, however, as when exchange is infrequent or client-specific, or when performance ambiguity is high and clients find it very difficult to evaluate the product or service they receive, then transaction costs are high. For example, to control performance ambiguity, organizations need to provide clients with much information and take steps to increase their visibility to them. These demands force organizations to design work procedures that facilitate clients' involvement, which raises negotiating and monitoring costs. Also, to respond to high transaction uncertainty and the unpredictability of a work process, an organization will need to employ specialized individuals. As a result, it is very difficult to monitor and evaluate employees' behavior, and the potential for shirking and free riding is high. In this situation, price alone is not an efficient governance mechanism because it does not provide sufficient information for clients to evaluate organizational performance. Alternative mechanisms for governing exchange relationships between clients and employees may be expected when transaction costs are high. Also, organizations must adopt highly sophisticated and inclusive control practices in order to coordinate and control relationships between contact employees and their clients. In essence, it is likely that some form of hierarchical governance mechanism will supplement the market mechanism both to control employees' behavior and to manage relationships between clients and organizations.

Thus, growth in levels of transaction uncertainty and performance ambiguity lead to increasingly complex forms of internal governance structures as organizations and clients attempt to economize on transaction costs. Specifically, transaction characteristics affect organizational structures, control systems, and forms of task interdependence.

HYPOTHESES

As noted, when transaction costs are low, the market mechanism is sufficient to mediate transfers of goods and services between clients and organizations. Thus, I hypothesized that when transaction uncertainty and performance ambiguity are low, organizations adopt simplified operations in order to reduce costs of coordination and control so as to be able to

³ It is worth mentioning that transaction costs do not simply disappear when firms choose hierarchy over the market. Potential agent opportunism, or shirking, and performance ambiguity are still problems. In defining their boundaries, organizations are constantly trading off the relative costs of hierarchy and market. This issue is not always clear in transaction cost theory because Williamson explicitly frames his arguments in terms of a movement from market to hierarchy. Agency theory (Jensen & Meckling, 1976), however, is framed in terms of movement from hierarchy to market and considers the advantages of disintegration or vertical deintegration. Ultimately, these two approaches are different sides of the same coin.

compete on price. However, as the ambiguity and uncertainty of transactions increase, organizations must bear the bureaucratic costs of hierarchical structures in order to manage both the exchange relationships among organizational employees and those between clients and organization.

Hypothesis 1: Transaction uncertainty and performance ambiguity will be positively related to vertical and horizontal differentiation.

Some theorists (e.g., Child, 1985), developing Graicunas's (1937) propositions, have suggested that an arithmetic increase in number of hierarchical levels or subunits is associated with a geometric increase in costs of management. Thus, the structure with the lowest bureaucratic or management costs is likely to be one with the lowest level of vertical differentiation; it will have the fewest hierarchical levels and the widest spans of control relative to size. Also, it is likely to be the one with the lowest level of horizontal differentiation, or the fewest number of task-specialized units relative to size. This is because the actual overhead costs of employing managers in simple structures is low compared to the overhead incurred with narrow spans of management and numerous hierarchical levels across and within subunits. Also, the information costs of managing a hierarchy and securing coordination between subunits will be high when there are many hierarchical levels and great diversity across and within subunits.

Organizations may also match their governance structures to the levels of transaction uncertainty they experience by adopting various forms of task interdependence among employees. Thompson (1967) argued that firms will use more complex forms of task interdependence to control higher uncertainty surrounding transactions. In the present analysis, the more client-specific the transactions, the more infrequent and thus unpredictable they are, and the more complex the information exchange involved, the higher will be the level of employees' task interdependence necessary to coordinate these transactions with clients. This is because unique or unpredictable demands from clients require institutionalization of complex work routines and role relationships to solve their problems; hospitals, where the use of reciprocal interdependence is a response to unpredictable client needs, provide an example. Also, because organizational performance depends on the production of a team when task interdependence is high (Jones, 1984), organizations need to use governance structures that allow employees to monitor the behavior of other employees in order to control for shirking.

Hypothesis 2: Transaction uncertainty will be positively related to the use of complex forms of task interdependence.

The third way that organizations structure exchange processes is to influence employees' behavior and hence clients' perceptions through particular forms of control or reward systems. In general, the lower the degree of transaction uncertainty and thus the more standardized the transactions, the easier it is to monitor employees' behavior and resulting outputs. Consequently, it is both practical and inexpensive to apply behavior and output controls

(Eisenhardt, 1985; Ouchi, 1980). However, when transaction uncertainty is high and it is difficult to monitor the performance of specialized employees, it is also very difficult or expensive to use behavior and output controls. High performance ambiguity also affects control systems when it is difficult for clients to evaluate the services they receive, including the performance of organizational employees. Specifically, both behavior and output controls are inappropriate because they do little to allow clients to evaluate employees' behavior and may provide employees with incentives to act opportunistically, furthering their own goals at the expense of the clients. For example, output targets and commission pay systems may conflict with clients' needs for high levels of information or quality of service.

When performance ambiguity and transaction costs are high, an organization will need to convince clients that it is acting in their interests by developing a governance structure that reassures them it will not act opportunistically towards them. Since employees' behavior is the most visible sign to clients of organizational performance, they are likely therefore to adopt structures, and particularly control systems, to control clients' perceptions by influencing employees' behavior. Performance ambiguity influences governance structures through its effect on the way organizations control employees in order to influence clients' perceptions. For example, performance ambiguity will be high in doctor-patient relationships. To convince clients that they are dealing with a reputable organization, hospitals will respond by controlling who provides services and how they do so. Specifically, high professional qualifications, intensive socialization, and the development of medical norms will be used to develop a professional culture to control doctors' behavior and hence convince clients of the quality of organizational performance. However, when performance ambiguity and transaction costs are low, no such elaborate control system is likely because clients can easily evaluate the quality of service they receive.

Thus, when transaction uncertainty and performance ambiguity are high, organizations will use indirect or unobtrusive controls rather than obtrusive controls to influence employees' behavior (Perrow, 1979). First, in order to increase their ability to monitor and evaluate that behavior, organizations will purchase information through high use of bureaucratic controls like formalization (Eisenhardt, 1985; Ouchi, 1980). Second, since the transfer of information to clients is one means of controlling the uncertainty or ambiguity they experience, organizations will tend to demand high levels of employees' specialization and to use professionals or experts to control exchange relationships. With such employees, organizations can rely on professional control (Jones, 1983), in effect using extensive training or socialization to control their behavior. For example, in the medical or legal professions, education and training serve to structure professional behavior. Organizations are likely to employ such professional control when uncertainty surrounding transactions with clients is high.

Hypothesis 3: The use of behavior and output controls will be negatively related to performance ambiguity and

transaction uncertainty; formalization and professional control will be positively related to these variables.

METHODS

Data

A group of service organizations provided the data for examining the effects of transaction characteristics on organizational choices concerning coordination. The selection process attempted to maximize the variety of the transactions between customers and organizations so that variance would be sufficient for statistical analysis. I obtained a complete listing of service organizations in a medium-sized southwestern city through the local property-tax assessment agency. This listing classified businesses according to type of activity and classified businesses within each type by property value. Drawing only on the larger service organizations, defined as those whose assessments exceeded \$75,000, I chose random, proportional, stratified samples of organizations from each service classification. In addition, two police departments and two fire departments were included. Table 1 describes the 62 organizations in the final sample. Their average size, as measured by mean number of full-time employees, was 19.9 employees. They were, for the most part, branches of chain stores, small businesses, or agencies engaged in typical customer-service activities. These organizations were sufficiently small to allow meaningful comparison of structural measures with measures of transaction characteristics at an organizational level (Comstock & Scott, 1977).

Data were obtained from two sources. Organizational charts, when available, and interviews with the owner or line manager of each organization provided information on structural variables and task interdependence. Questionnaires distributed to the owners or managers and to a group of employees who had contact with clients provided information on transaction uncertainty, performance ambiguity, and forms of control. This mixing of data collection methods reduced problems of common method variance in evaluating results. The mean number of respondents per firm was five, one manager and four employees, with a range from three to six. Since the unit of analysis in this study was the organization, I averaged individuals' responses to arrive at a score for each organization. Following procedures suggested by Hage and Aiken (1969), to ensure a synthetic view of the transaction characteristics of each firm, I weighted the responses of each owner or manager equally with the average of the employees' responses. In order to ensure that the aggregation of responses to create a total score for each organization was methodologically justified, I conducted one-way analyses of variance for each of the measures from the questionnaire, using each organizational identity as a category of the independent variable. The *F* associated with each measure was significant, indicating that within-group or organizational variance was lower than between-group variance. This indicated that it was meaningful to aggregate across respondents for statistical purposes. Where

TABLE 1
Firms in Sample

Types of Organizations	Numbers	Types of Organizations	Numbers
Advertising agency	1	Garden store	1
Architectural firm	1	Food and wine shop	1
Auto repair shop	2	Hardware store	2
Auto supply store	1	Hair design studio	2
Bank	2	Insurance company	3
Brokerage firm	3	Jewelry store	2
Chartered accountancy	2	Law partnership	2
Computer store	2	Machinery supply store	1
Consulting engineers	1	Opticians office	3
Credit union	1	Police department	2
Department store	2	Realty agency	2
Discount store	3	Savings and loan institution	1
Dialysis unit of hospital	1	Supermarket	3
Emergency unit of hospital	2	Title insurance company	1
Engineering consultancy	2	Tire sales and repair shop	1
Exercise club	1	Travel agency	2
Fire department	2	Utilities	3
Furniture store	1		

appropriate, I calculated the reliabilities of the questionnaire measures at an individual level of analysis.

Measures of Independent Variables

Transaction uncertainty. In order to operationally define transaction uncertainty, it was necessary to use measures that were sufficiently general to allow comparison across the wide diversity of organizations surveyed but that were also specific enough to capture the contingencies involved in any particular transaction. I measured the three facets of transaction uncertainty by evaluating how infrequent, how long, and how specific transactions between employees and clients were on the average. Questions and response formats appear in the Appendix. Table 2 gives the correlations between these measures. The final measure of transaction uncertainty is an additive function of these three components, similar to measures of job complexity that are additive functions of the different dimensions of tasks.

Performance ambiguity. Responses from employees on a 6-item scale measured performance ambiguity; all items used a 7-point response format ranging from strongly agree to strongly disagree ($\alpha = .72$). This scale appears in the Appendix. Although it might seem more reasonable to ask clients to evaluate degree of performance ambiguity, I did not consider this necessary for several reasons. First, employees' contact with clients in face-to-face interactions allows them to estimate the problems the latter experience. Moreover, since employees are most aware of the particular problems they encounter in their work, they are presumably in the best position to evaluate the potential for performance ambiguity. Finally, previous research

TABLE 2
Intercorrelations Between All Variables^a

Variables	Means	Standard Deviations	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Transaction duration	6.2	2.7														
2. Transaction infrequency	5.0	3.4	.52													
3. Transaction specificity	10.5	3.0	.24	.10												
4. Transaction uncertainty	21.7	6.6	.79	.77	.60											
5. Performance ambiguity	59.0	12.3	.20	.31	.06	.27										
6. Levels in hierarchy	2.6	1.3	-.10	.07	.18	.08	.10									
7. Span of control	11.7	8.2	-.33	-.22	-.40	-.45	-.30	.13								
8. Horizontal differentiation	3.7	2.1	-.41	-.28	-.29	-.44	-.12	.40	.53							
9. Task interdependence	1.7	0.8	.36	.23	.25	.39	.13	.06	-.15	-.06						
10. Formalization	27.1	6.0	.17	.04	-.05	-.07	-.01	.02	.18	.22	-.10					
11. Output control	16.8	6.1	.14	.15	.19	.22	.19	-.11	-.20	-.27	.21	.01				
12. Behavior control	16.2	4.8	-.17	-.30	-.22	-.32	-.54	-.20	.20	.19	-.22	.02	.06			
13. Professional control	6.9	2.4	.46	.14	.40	.44	.37	-.05	-.36	-.46	.57	-.01	.15	-.36		
14. Size	1.2	0.5	-.33	-.27	-.12	-.33	-.02	.62	.52	.66	-.41	.34	.20	-.03	-.28	

^a $n = 62$; all correlations above $r = .21$ are significant at $p < .05$; above $r = .29$, $p < .01$; above $r = .37$, $p < .001$.

(Schneider, Parkington, & Buxton, 1980) has demonstrated that there are very high correlations between service employees' and customers' perceptions of several dimensions of the performance of these employees, including perceptions of the quality of service given and received. This finding is relevant for the present research, suggesting that employees' perceptions are a good substitute for clients' perceptions in evaluations of the characteristics of transactions between the two groups. There are thus both empirical and theoretical reasons for using employees' evaluations as a proxy for clients' evaluations about the level of performance ambiguity present in transactions.

Measures of Dependent Variables

Structural variables were adapted from the operational definitions suggested by Beyer and Trice (1979). Vertical differentiation was measured as the number of supervisory levels in an organization and span of control as the number of client-contact employees each manager directly supervised. I measured horizontal differentiation as the number of different departments or functions inside an organization, and defined size, which served as a control variable in the study, as the log of the number of full-time employees plus one-half the number of part-time employees. Part-time employment is particularly prevalent in service organizations because demand fluctuates. I measured task interdependence as a categorical variable, giving owners and line managers a graphic representation of forms of task interdependence (Van de Ven & Ferry, 1980) and, after explaining the diagram, asking them to classify the interactions among employees necessary to satisfy clients' demands as pooled, sequential, or reciprocal.

Four forms of control were assessed. I measured output control with a dichotomous measure differentiating hourly and salaried pay from pay based at least in part on such outcomes as sales. Following Eisenhardt (1985), I considered any form of sales commission or performance-based compensation as evidence of output control. I measured behavior control following Ouchi (1977), using two 7-point scales: "To what extent do you check to see what employees are doing on the job," and "I frequently get involved in helping employees perform their normal work activity" ($\alpha = .77$). I used the degree of employees' personal specialization as a proxy for professional control (Beyer & Trice, 1979), asking owners and managers to describe the level of education and the amount of job-related training needed by client-contact employees on 7-point formats ($\alpha = .62$). Finally, I measured formalization using Van de Ven and Ferry's (1980) 4-item scale ($\alpha = .78$).

RESULTS

Table 2 presents the correlations between the three dimensions of transaction uncertainty and the other variables. Although the intercorrelations of transaction specificity with the other two dimensions are low, each of the three dimensions is related to the dependent variables in the same direction. This supports the use of the composite variable, transaction uncertainty, in

the subsequent analysis. I tested the study's main hypotheses via hierarchical regression analysis, using size as a control variable because previous work has shown that it has independent effects on structure and control (Pugh, Hickson, & Hinings, 1969). As a control variable, size was entered first into the regression equation, followed by transaction uncertainty and then by performance ambiguity. I performed separate regression analyses for each dependent variable. Table 3 presents the results of this procedure. For the structural variables, size contributed the most to the variance explained; however, the presence of a significant beta-weight for the other independent variables indicates that they also contributed significantly to variance explained. Table 3 gives the increase in variance explained at each step in the procedure.

Hypothesis 1 posited that levels of vertical and horizontal differentiation will be positively related to levels of transaction uncertainty and performance ambiguity. The results provide mixed support for this hypothesis. High levels of transaction uncertainty are significantly associated with high numbers of hierarchical levels and with narrow spans of control, both representing high vertical differentiation. However, high levels of transaction uncertainty are also significantly and negatively related to degree of horizontal differentiation. In other words, the more uncertain the transaction, the less likely it is that firms will divide up the work to be performed into task-specialized units. In this connection, Hypothesis 2, stating that high levels of transaction uncertainty will be associated with complex forms of task interdependence, becomes relevant. To test this hypothesis, I used discriminant analysis to examine if the values of transaction uncertainty and performance ambiguity differed significantly between forms of task interdependence. This procedure resulted in one significant discriminant function ($\chi^2 = 19.4, p < .001$) accounting for 92.7 percent of variance explained. Examination of the loadings of transaction uncertainty and performance ambiguity on the standardized discriminant functions revealed that transaction uncertainty was the principal variable accounting for this result, suggesting that form of task interdependence is positively related to level of transaction uncertainty. This provides support for Hypothesis 2. It appears that organizations adopt pooled interdependence when transactions are standardized, but that with higher uncertainty, they adopt sequential or reciprocal interdependence to manage transactions with clients. Thus, at high levels of transaction uncertainty, firms respond by adopting complex forms of task interdependence rather than high levels of horizontal differentiation. The throughput phase of the technological process becomes highly sophisticated (Rousseau, 1979).

For the variables representing structure and task interdependence, performance ambiguity is only significant in its relationship with span of control. This suggests that when clients have little difficulty in monitoring employees' behavior, spans of control are wide because clients bear the monitoring burden. However, at high levels of performance ambiguity, the activities of

TABLE 3
Results of Hierarchical Regression^a

Dependent Variables		Size	R ²	Transaction Uncertainty	R ²	ΔR	Performance Ambiguity	R ²	ΔR^2	F
Levels in hierarchy	β t	.72 (7.22)***	.38	.31 (2.99)**	.48	.10*	.03 (.30)	.48	.00	17.84***
Span of control	β t	.44 (4.08)***	.26	-.22 (-1.98)*	.35	.09*	-.23 (-2.18)*	.40	.05*	12.70***
Horizontal differentiation	β t	.57 (5.85)***	.43	-.24 (-2.37)*	.50	.07*	.04 (.40)	.50	.00	19.02***
Formalization	β t	.35 (2.68)**	.11	.05 (.36)	.11	.00	-.01 (-.10)	.11	.00	2.50
Output control	β t	-.26 (-2.11)*	.10	.21 (1.57)	.12	.02	-.26 (2.10)*	.18	.06*	4.34**
Behavior control	β t	-.12 (-1.05)	.00	-.23 (-1.97)*	.13	.13*	-.47 (-4.27)***	.33	.20*	9.72***
Professional control	β t	-.16 (-1.44)	.08	.30 (2.54)*	.21	.13*	.28 (2.49)*	.29	.16*	7.95***

^a n = 62.

*p < .05

**p < .01

***p < .001

supervisors become the principal monitoring device. Performance ambiguity is not, however, related to number of hierarchical levels.

In general, the results suggest that transaction uncertainty is a better predictor of structure and task interdependence than performance ambiguity. However, for each dependent variable except for task interdependence, size has strong independent effects. Thus, there is some support for the hypothesis that the nature of transactions between organizations and clients is a determinant of organizational governance structures. The higher the level of transaction uncertainty, the greater the degree of vertical differentiation and the more complex the form of task interdependence.

Hypothesis 3 deals with the effects of transaction characteristics on organizations' control systems, positing that transaction uncertainty and performance ambiguity will be negatively related to behavior and output controls. With one exception—the positive but nonsignificant relationship of transaction uncertainty with output control—results support this hypothesis. For example, when performance ambiguity is high and it is difficult for clients to evaluate employees' behavior, it is also difficult for supervisors to use control of behavior or outputs to monitor employees' behavior.

Given such a monitoring vacuum, organizations may turn to bureaucratic or professional controls as surrogates for behavior or output controls. Results only partially support this hypothesis. Formalization is not related to either transaction uncertainty or performance ambiguity. In other words, it appears that the use of rules and procedures is not an appropriate means of control when transactions are complex. However, high levels of transaction uncertainty and performance ambiguity are significantly, positively related to professional control. Firms appear to employ individuals with high levels of education and training in an attempt to control clients' perceptions; similarly, they respond to high transaction uncertainty by employing highly specialized personnel.

DISCUSSION AND CONCLUSIONS

Considered jointly, the results of this study provide some support for the proposition that the characteristics of transactions between organizations and clients affect forms of organizational control and coordination. If these results are viewed as a gestalt, it appears that two main forms of governance mechanism emerge in response to monitoring problems that transaction uncertainty and performance ambiguity produce, and the consequent need to economize on transaction costs at organizational boundaries.

First, when transaction uncertainty and performance ambiguity are low, organizations develop flat structures with wide spans of control at the level of client-contact employees. Further, they divide the total task to be performed into task-specialized units and further reduce task interdependence by using pooled interdependence to mediate transactions. As a result, employees' behavior can be easily monitored and behavior and output control are the principal means of control. They can do this because their environments are standardized and relatively predictable.

However, when transaction uncertainty and performance ambiguity are high, monitoring becomes difficult and organizations must adopt more sophisticated control practices. First, they increase the numbers of levels in their hierarchies and reduce spans of control to increase employees' accountability. Second, they attempt to reduce uncertainty and increase their capacity to process information through specialization. For example, they may restrict the number of different goods and services they provide, which is manifested in a low level of horizontal differentiation, and use highly complex modes of task interdependence to coordinate work processes. Also, since size is significantly and negatively related to level of transaction uncertainty ($r = -.33, p < .01$), it appears that organizations providing specialized services tend to stay relatively small.

Thus, the first implication of the analysis concerns the emergence of specialized or generalized organizations as a response to the uncertainty of transactions. One way in which organizations can control transaction uncertainty or performance ambiguity is by restructuring the amount of uncertainty they face through choosing certain types of clients or specializing in certain kinds of transactions. In this sense, they economize on transaction costs because they choose to engage only in transactions where they have the specialized knowledge or ability to easily evaluate and structure exchange relationships. Similarly, by specializing in one or a few basic tasks, they acquire the repertoires of skills that serve to convince customers they are dealing with experts.

On the other hand, when transactions are short, frequent, and highly standardized, uncertainty is low; the organizational problem is either to maintain a flow of transactions with clients or, as Thompson (1962) noted, to increase the populations served. Under these conditions, the monitoring problem for both supervisors and clients is minimal, and the most efficient way of economizing on transaction costs is to reduce the level of interaction between clients and organizations and to routinize the work process. This allows the employment of client-contact personnel who possess few specialized skills; behavior control is then the most efficient and inexpensive means of control, assuming that employees' behavior is visible to clients. It is interesting that the movement to self-service operations reduces transaction costs because it uncouples client and employee and, moreover, makes the former bear search costs, with the reward of lower prices.

As argued, theory suggests that use of bureaucratic control will increase with transaction complexity or performance ambiguity as it becomes more difficult to monitor and evaluate employees' behavior. The finding that formalization was statistically unrelated to either transaction uncertainty or performance ambiguity is interesting in this context. It appears that level of formalization is independent of the nature of service organizations' transactions. When transactions are standardized and uncertainty is low, behavior and output controls appear to be sufficient to mediate the exchange relationship: rules do not need to be written. On the other side, when transaction uncertainty is very high, and clients' inputs are vital to task completion,

rules are also not applicable since they cannot deal with the unpredictability of work demands. In this situation, it is necessary to rely on the skills and abilities of experienced personnel. It is possible that this is the reason why formalization is unimportant as a means of controlling transactions. Size appears to be the most important predictor of formalization (Pugh et al., 1969).

Another implication of the analysis concerns the nature of the relationship between technology and transaction. Does an organization's choice of a form of transaction precipitate the use of a form of technology, or does the use of a particular technology precipitate a form of transaction at its organizational boundary? For example, consider hospital patients as a source of uncertainty. In the case of emergency departments, the greater the unpredictability of patients' complaints, the more complex the form of work interdependence required (Argote, 1982). However, it may also be that many doctors become specialists to reduce variation in inputs. Thus, structuring transactions in certain ways makes different forms of technology appropriate. On the other hand, it is clear that adopting a form of technology makes it possible to structure a transaction. For example, McDonald's introduced capital-intensive mass production into its food operations to reduce the specificity and duration of transactions. Similarly, Henry Ford's aphorism, "You can have any color car as long as it's black," suggests that the way goods and services are produced is a principal determinant of transactions. However, Woodward (1965) noted that a firm that successfully specialized in mass production encountered many problems when it attempted to turn to batch production to increase its market share. She attributed its problem to a structure that could no longer manage transactions because the structure was no longer appropriate to the technology employed. Thus, it seems that the main imperative facing organizations is three-pronged—they must simultaneously optimize the relationship among transactions, technology, and structure.

However, a caveat is in order. It has become conventional both to describe technology in terms of the degree to which a work process is routinized or easily understandable and to argue that the less well-understood or unprogrammed the work, the more complex will be the form of structure adopted (Fry, 1982; Hickson, Pugh, & Pheysey, 1969). Perhaps, however, it is only in the case of research and development activities that uncertainty truly implies the unknown. Most activities are eminently understandable in the sense that someone has worked out routines for success or failure. On these grounds, it is likely that the problem of strategically managing transactions will be the primary difficulty facing organizations. The nature of a transaction governs the form of the throughput process (Thompson, 1967).

A last implication of this research concerns the definition of transactions and in particular the dimensions used to define them. The three facets of transaction uncertainty used in this study, although appropriate here, are only a subset of the possible dimensions underlying transactions. Future research should select out the dimensions of transactions that are appropri-

ate to the populations of organizations under study. For example, Thompson (1962) proposed that the extent to which clients must participate in exchange influences transactions. A client's dependence on a particular organization is likely to be a significant issue, because in such situations transactions become one-sided, and firms may be able to structure them to further their interests at the expense of the client's. Opportunism, to some degree a consequence of level of performance ambiguity, becomes an important issue. My original research design included questions concerning the extent to which client-contact employees could act or were acting opportunistically towards clients; however, managers were unwilling to allow employees to answer such questions so I could not explore this issue.

Another dimension of transactions that may be important is their significance. For example, some transactions may be life-threatening, such as those in hospitals, and others are purely mundane, such as those in grocery stores. Similarly, some transactions have long-term consequences, and others have consequences that are short-term or even one-time. In order to further understand the effects of the transfer of goods and services at organizational boundaries on the internal natures of organizations it will be necessary to isolate the context-specific sources of transaction uncertainty and performance ambiguity.

On this issue, the measurement of the dimensions of transaction uncertainty and performance ambiguity in this research deserves consideration. Because of the diversity of organizations surveyed, my measures were not as sophisticated as one might wish, for it was not possible to devise specific measures that were equally appropriate in organizations as different as fire stations, hospitals, and grocery stores. Since this was an exploratory study whose focus was on generalization across different contexts, the use of these measures is defensible. However, to further understand the effects of transaction characteristics on organizational governance mechanisms, it may be useful for future research to limit the diversity of populations and to define measures in a more detailed fashion. Such limits may make it possible to investigate the dynamics of the relationships among technology, transaction, and structure.

There are other qualifications. First, the sample used in this study consisted of relatively small organizations. In larger organizations, subunits may be somewhat buffered from clients. However, given that all subunits deal with stakeholders in their task environments, in large organizations the relevant governance structures may be those of subunits. Also, in manufacturing firms that do not deal directly with individual clients, other types of stakeholders may be the relevant focus of analysis for understanding the designs of governance structures. Given the diversity of possible stakeholders, organizations may have many different kinds of transactions. In this study, I assumed that they experience one basic or average type of transaction with clients. For large, complex organizations providing many different kinds of products or services, an approach that captures variance across transactions

is necessary to fully capture the subtlety of the relationships between clients and organizational governance structures.

Finally, using structure and control to operationally define the form of governance mechanism being employed to manage transactions is only one—the most observable—way of defining a governance mechanism. It is also possible that organizational culture will be an important element of governance since the reputation of an organization, its image or the values it personifies, and the guarantees it offers will be important determinants of parties' expectations and behavior.

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APPENDIX

Transaction Uncertainty

Infrequency. How frequently do employees deal with the average customer/client? At least once a week, every 2–3 weeks, monthly, quarterly, twice a year, once a year or less.

Duration. How much time does it take to deal with the needs of the average customer/client? Less than 5 minutes, 6–15 minutes, 16–30 minutes, 30–59 minutes, one hour or more.

Specificity. How would you describe the nature of the work employees provide to customers? Very standardized, it does not vary much from customer to customer; each customer has different needs and the work is different for every customer; 7-point format.

Performance Ambiguity

Responses were measured on a 7-point format ranging from strongly disagree to strongly agree. R indicates reverse scoring.

If customers watch employees at work they can easily tell how well they are doing their job.

It is difficult for customers to estimate the time or resources it takes to provide the service they require. (R)

Customers can always tell if they have received good service from this organization.

Customers have to assume they are getting good quality service because there is no way they can measure it. (R)

It is easy for customers to evaluate the service they get from this organization.

It would be very time consuming (or expensive) for customers to check up on how well I am performing my job. (R)

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ENVIRONMENTAL AND ORGANIZATIONAL PREDICTORS OF ADOPTION OF COST CONTAINMENT POLICIES IN HOSPITALS

KEITH G. PROVAN
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This study examined predictors of the adoption of cost containment policies in a national sample of 303 not-for-profit hospitals. Analysis of the full sample indicated that adoption of such policies was positively related to response to external regulation, cooperative interorganizational involvement, external orientation, number of beds, occupancy rate, and the influence of chief administrators on governing boards; adoption was negatively related to length of patients' stays. Additional exploratory analysis of the data revealed different combinations of characteristics that were unique to subgroups of hospitals with the lowest and highest levels of policy adoption.

Because the costs of health care have risen so rapidly in recent years, hospital administrators are experiencing substantial pressure to manage hospitals in a more cost conscious way (Smith, Fottler, & Saxberg, 1981; Weisbord & Stoelwinder, 1979). Although some specific cost containment measures are mandated by various public policies and regulations, most are not. As a result, it is usually up to hospital administrators to formulate, adopt, and implement policies that are effective in containing costs. Although almost all hospitals need to control their costs, some are likely to be more active in adopting cost containment policies than others. In part, this may be because of differences in the preferences and perspectives of their managers. A macro or sociological approach to the study of organizations and the literatures on policy and organizational change suggest that examining hospitals' involvement with their external environments and certain organizational characteristics related to size, efficiency, and board structure can explain managerial decisions to adopt policies promoting containment of costs.

THE POLICY PROCESS

The literature on how organizational policies emerge and develop has two fairly distinct focuses. The first is a rational-economic approach that is the basis of much of the literature on strategic management (Hofer & Schendel, 1978; Porter, 1980). This normative view holds that a careful and rational

My thanks to Phil Bobko for his helpful comments and to Mary Rogus for her assistance with the data analysis. The University of Kentucky Research Committee and the College of Business and Economics provided partial financial support.

analysis of an organization's external opportunities and threats from such sources as competitors, customers, suppliers, and regulators should be the basis for formulating organizational strategies and policies. Strategic-level decision makers must also conduct a rational analysis of their organization's internal capacities, weighing strengths like adequate financial and material resources, proprietary technologies, and low manufacturing costs on the one side and weaknesses like obsolete facilities, weak R&D efforts, and poor marketing skills on the other. Once they have analyzed and evaluated all these elements, they can formulate appropriate strategies and policies.

Although this approach is helpful in forcing policy makers to think about some major factors that are likely to affect organizational success, it does not necessarily reflect the actual process that they use in formulating strategies and policies. For one thing, there is some question as to whether managers can and do undertake rational environmental analyses. Instead, they may formulate policies on the basis of their perceptions of their environments (Anderson & Paine, 1975) or even environments that they themselves have created (Smircich & Stubbart, 1985). Perhaps more important, however, is that the literature has viewed the entire policy process as sequential instead of interactive; in this view, organizations first formulate, then adopt, and then implement policies. Although this view allows researchers to isolate the main components of the policy process, it ignores the effects of managers' anticipating implementation problems on the formulation and adoption of policies. Some of the same external and internal conditions and characteristics that affect both policy formulation and implementation are also likely to affect policy adoption, the middle step in the sequence.

A second approach to explaining the policy process in organizations, originally guided by the work of Lewin (1947), Schein and Bennis (1965), and others, focuses on the social and psychological correlates of change. Not all organizational changes are policy changes, but many are; thus, this approach is useful as a complement or an alternative to the rational-economic approach. Actually, most textbooks on policy and strategic management (e.g., Higgins & Vincze, 1986; Pearce & Robinson, 1985; Thompson & Strickland, 1984) borrow from this behavioral perspective and from organizational theory to explain how strategies are implemented, focusing on such concepts as power and politics, organizational structure, leadership, and organizational culture (cf. Hrebiniak & Joyce, 1984).

Policy research using aspects of this organizational change perspective has tended to be far more descriptive and explanatory than research employing the normative approach. Key organizational policies figure as dependent variables to be explained by whatever internal and external factors appear to be most relevant for the organizations and conditions being researched (Beyer & Trice, 1978; Hage & Aiken, 1970; Zaltman, Duncan, & Holbek, 1973). However, this approach tends to focus far more heavily on the behaviors and attitudes of organizational participants than on the objective analysis of external environments that many in the field of strategic management have suggested. Nonetheless, the change perspective provides a valuable alterna-

tive approach that the strategic management literature has seldom fully considered for the study of all stages of the policy process.

Various scholars have offered models of how policies emerge and develop over time that are based on the organizational change perspective. Most can be summarized in terms of three steps: an organization's management first evaluates the need for changes in policy; if it deems any changes necessary, it makes decisions on adoption; finally, implementation occurs. Beyer and Trice (1978) added a new stage to this model: institutionalization of changes, which occurs if organizational members accept and internalize newly implemented policies. Although most of the research using this change perspective is not longitudinal, its heavy reliance on social and behavioral factors to explain policy decisions and the importance it gives to all three (or four) steps in the process of changing policies implies that formulation, adoption, and implementation are all tightly coupled. This interrelationship is an important assumption for the present study because issues related to both formulation and implementation are likely to affect policy adoption, the intermediate step in the process. Also, as distinct from the rational-economic view, in the perspective adopted here the adoption and eventual implementation of policies are based not only on objective organizational and environmental realities but also on managerial responses to these realities, their roles in creating them, and the preferences and power of key groups within organizations.

ADOPTION OF COST CONTAINMENT POLICIES

In the hospital industry, the need for adoption of policies for reducing hospital costs is well known (Schulz & Johnson, 1983: 238-255; Shortell, Becker, & Neuhauser, 1976; Smith et al., 1981; Weisbord & Stoelwinder, 1979). For years, hospital costs have outpaced the overall rate of inflation, making institutionalized health care expensive for all and unaffordable for many. In 1982, for instance, the overall consumer price index (C.P.I.) was 289.1, using a 1967 base of 100. In contrast, the C.P.I. for all medical care items in 1982 was 328.7, and for hospital rooms 556.7 (Health Insurance Association of America, 1984: 56-58). As a result, the pressures on hospitals to control costs have been considerable, particularly over the past 10 to 15 years. Many of these pressures have been external, coming from the public at large, government legislators and regulators, private insurers, and private employers who must pay for much of the cost of insuring their employees. However, internal hospital characteristics can also be important determinants of decisions to adopt cost containment policies; indeed, a combination of external pressures and internal decisions and preferences often determines these internal characteristics. Because the extent and effects of these internal and external factors are likely to be quite different across hospitals, substantial variance in the extent to which hospitals adopt cost containment policies is likely. Despite these differences, a general model outlining the influences on the formulation, adoption, and implementation of cost containment policies in hospitals can be proposed by drawing on the literatures

on strategy and policy discussed earlier and an understanding of decision making in hospitals. Figure 1 presents this model.

In this model, four groups of variables have direct or indirect effects on the development of cost containment policies. As with most organizations, managers in hospitals must respond to external environmental contingencies if their organizations are to become and remain effective. Unlike most other organizations, however, a hospital has two major and sometimes competing internal power groups that will be affected by and will respond to the external environment: (1) the chief administrator¹ and administrative staff, and the (2) clinical staff² (Bucher, 1970; Carper & Litschert, 1983; Smith, 1955). Administrators and physicians can also both affect and be affected by certain internal organizational characteristics of a hospital that can either encourage or discourage the development of cost containment policies. Typically, the chief administrator and staff will formulate such policies, or others will do so at their request. However, since both administrators and clinical staff must implement cost containment policies, relationships between the two will also influence the formulation of these policies and decisions to adopt them.

This study was an empirical examination of those internal and external organizational characteristics and conditions thought to be important for explaining the adoption of cost containment policies in hospitals. Since no firm prior research exists on these relationships, the study should be viewed as exploratory. Nonetheless, the conclusions of some of the more general research on organizations, coupled with an understanding of how hospitals work, support the development of four general hypotheses that reflect the main relationships proposed in the model.

HYPOTHESES

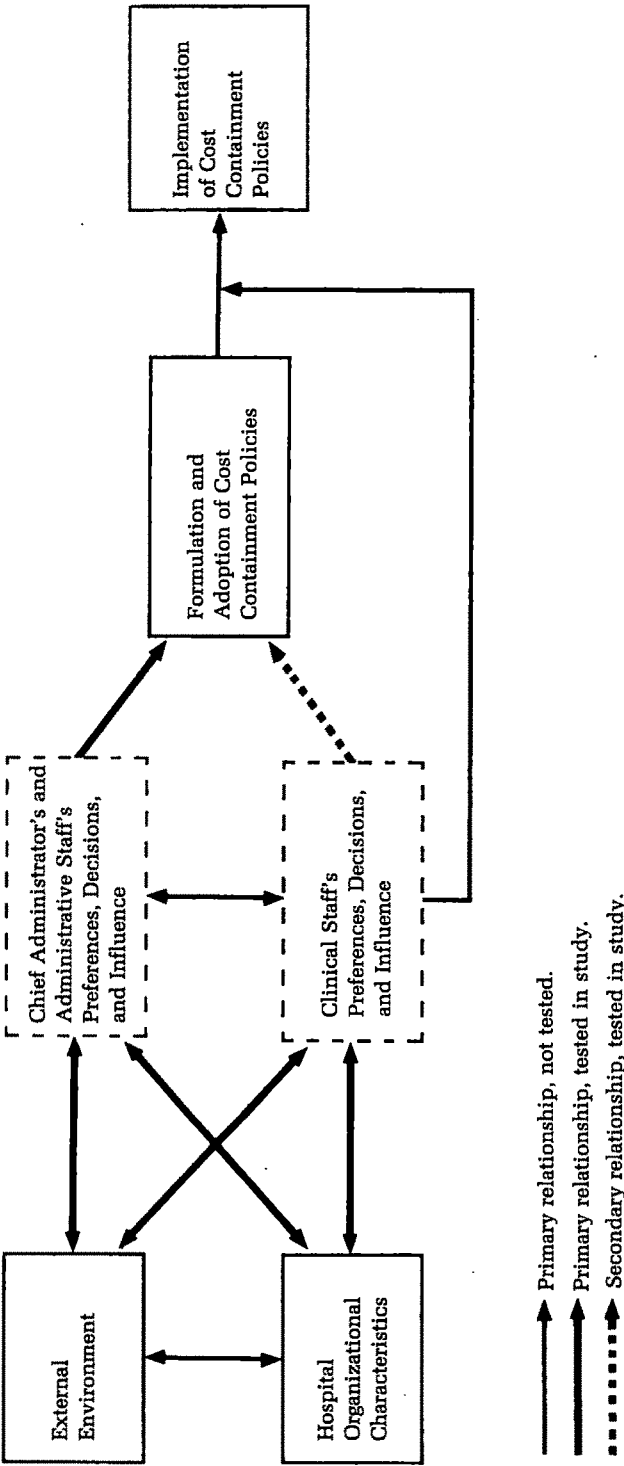
External Involvement

The literature on organization theory has thoroughly discussed the importance of external environments for influencing organizational structures and processes (Lawrence & Lorsch, 1967; Pfeffer & Salancik, 1978). In addition, Hofer and Schendel (1978), Porter (1980), and others have analyzed environmental effects on policy and strategy decisions. In most hospitals, management must understand the external environment in order to adapt to the many changes the health care industry has experienced since the 1960s. Because of external pressures regarding regulation, competition, fund acquisition, personnel shortages, and increased clinical effectiveness, just to name a few, hospital managements have had to develop internal policies

¹ The term chief administrator is used throughout although the title chief executive officer is becoming common in hospitals.

² In this regard, hospitals differ as well from most other professional organizations since physicians share power with individuals from a different profession.

FIGURE 1
Proposed Influences on the Formulation, Adoption, and Implementation
of Cost Containment Policies in Hospitals



^a The dotted lines around the administrative and clinical staff boxes indicate that external environment and hospital organizational characteristics affect policy formulation and adoption through the preferences and influence of these two groups. This indirect relationship was not tested in this study.

that enable them to respond to these pressures while still managing day-to-day operating routines. One of the major external pressures hospitals face is pressure for cost containment (Smith et al., 1981). Thus, the development of cost containment policies has been a critical concern for hospital administrators.

Previous research (Cook, Shortell, Conrad, & Morrissey, 1983) has proposed that hospitals will have a strong need to respond internally when external regulatory pressures are high and that this response will have a major effect on organizational behavior. Since so much regulation of hospitals has cost containment as its aim—particularly rate review and certificate of need programs³—it is likely that pressures from regulatory groups will lead at least to adoption, if not to implementation, of cost containment policies.

Another major phenomenon in health care is that hospitals have become increasingly linked to other care givers and to related organizations as a way of enhancing their own chances for survival in an environment that has become highly regulated, highly competitive, and closely scrutinized. The major effort in this direction has been the development of shared clinical, administrative, and other support services among hospitals and other health care facilities (Taylor, 1977; Schermerhorn & Shirland, 1981). Furthermore, many hospitals have joined or formed multihospital systems enabling them to pass the management of what would be a rather complex interorganizational network to another institution (Fottler, Schermerhorn, Wong, & Money, 1982; Provan, 1984; Zuckerman, 1979). By developing these interorganizational ties, hospitals can, at least in theory, provide services and engage in activities that would be more costly and sometimes less effective if done on their own. Thus, hospitals involved in cooperative interorganizational activities are likely to be concerned with cost containment since a major reason for developing such linkages is the idea, which may or may not become a reality, that they can control costs (Schermerhorn & Shirland; Zuckerman).

Finally, it is reasonable to suspect that hospitals that depend largely on external funding will have a greater concern for cost control than other hospitals. This idea builds on Pfeffer's (1973) study of hospitals' governing boards. He found that the voluntary community hospitals in his sample were more likely to have externally oriented boards than the religiously affiliated and government-owned hospitals whose funding was more certain and less externally dependent. It would be consistent with their greater need to attract funds from uncertain outside sources that externally oriented voluntary hospitals would also be highly concerned with controlling their costs. Hospitals with a good record of cost containment are more likely to attract funding and other scarce resources and will probably use more efficiently whatever funding they are able to get. In addition, government and religious hospitals often have a traditional commitment to serve the indigent and to provide a

³ Certificate of need legislation forces hospitals to obtain state approval for construction or renovations costing above a specified amount. Rate review programs, mandatory in some states and voluntary or non-existent in others, attempts to regulate what hospitals charge for services.

broad range of services, some of which may not be profitable. Since these characteristics are not conducive to cutting costs, the adoption of cost containment policies would appear to be more likely in voluntary, externally oriented hospitals that are less constrained by ownership and source of funding.

Overall, it seems that hospitals are most likely to adopt cost containment policies when external regulatory pressures are high, when they are highly involved in cooperative interorganizational activities with other hospitals, and when their funding depends on external sources. Under such external conditions, hospital managements will generally push for the adoption of cost containment policies, and chief administrators should be able to convince their medical staffs of the need to adopt these policies, thereby enhancing the probability of their implementation.

Hypothesis 1: The greater a hospital's involvement with and dependence on its external environment through regulation, cooperative interorganizational activity, and external sources of funding, the more likely it will be to adopt cost containment policies.

Hospitals' Characteristics

Certain characteristics may enhance the likelihood that a hospital will adopt cost containment policies. Since it is by no means clear which characteristics best predict cost containment policies, I considered several—but certainly not all—possibilities. Although previous research has strongly documented the importance of size for explaining hospitals' structures and processes (Graeff, 1980; Rushing, 1974), no research is available on the relationship between size and cost containment policies. However, a positive relationship seems likely. The high volume of business or number of patients in large hospitals means they will incur more total costs than small ones, necessitating a concern for cost control. Because there also tends to be a high level of administrative complexity in larger hospitals, control over these greater costs is likely to be more decentralized than in smaller ones. As a result, the managements of large hospitals are likely to push for adoption of formal policies to control costs that they personally do not have time to monitor. In addition, managers of large hospitals are more likely to be professionals than those of small ones, implying a greater recognition of the need to adopt such policies.

Hospital efficiency is also likely to be helpful for predicting the adoption of cost containment policies. Two measures of efficiency that are used in research on hospitals are occupancy rate and length of patients' stays. Hospitals with high rates of occupancy use their facilities efficiently (Roos, Schermerhorn, & Roos, 1974; Rushing, 1974). Although low occupancy rates signal a need to reduce costs, such a reduction may or may not happen. My presumption is that hospitals with high occupancy rates have them at least in part as a result of managerial efforts to fill beds in efforts to be more efficient. These efforts are likely to indicate strong managerial concern for

overall cost control that will be likely to lead to the adoption of formal cost containment policies.

Shortening the lengths of patients' stays is a major way of reducing their costs (Dumbaugh & Neuhauser, 1976), but it does not necessarily reduce hospitals' costs. In fact, shorter stays may increase hospitals' costs per day. Hospitals also benefit, however—revenues for the first few days of patients' stays are generally the highest because they undergo most tests and procedures during this period. A concern with efficiency in serving patients seems likely to imply a concern for cost control since relatively efficient hospitals are obviously interested in enhancing their own financial well-being. Thus, the research question for this study was whether or not these more efficient hospitals actually develop and adopt formal policies to contain costs.

Hypothesis 2: Hospitals that are relatively larger and efficiently managed are more likely to adopt cost containment policies than those hospitals that do not have these characteristics.

Influence over Policy Decisions

As discussed previously, the two major power groups in hospitals are (1) chief administrators and their staffs and (2) clinical staffs. However, governing boards can also play an important role in influencing policy decisions. Although the extent to which a board is likely to be actively involved in internal organizational decisions will vary depending on the needs of the hospital (Pfeffer, 1973), its position at the top of the organizational hierarchy conveys high potential power. Thus, the capacity to influence a board's thinking and decisions will be important for internal hospital groups who want policies to reflect their views. Influencing a board is particularly important in an organization like a hospital in which there are two, often competing, internal power groups having conflicting goals and perspectives (Scott, 1982; Smith, 1955). The boards of many not-for-profit hospitals do not include their chief administrators, and many have no physicians. It seems more likely that a board will regularly consider their views when a member of either of these groups serves on it than when they do not.

The presumption here is that general administrators tend to have a management orientation, as well as what Scott (1982) referred to as a macro health care perspective, and will thus be more concerned with cost containment than will physicians. Clinical staffs, with their more micro concern for individual patients' needs for health care, will probably find formal cost containment policies a constraint on their activities and thus will resist them.

Hypothesis 3: Hospitals with chief administrators on their governing boards are more likely to adopt cost containment policies than hospitals without chief administrators on their boards.

Hypothesis 4: Hospitals with one or more physicians on their governing boards are less likely to adopt cost con-

tainment policies than hospitals without physicians on their boards.

The four hypotheses represent many, but not all, of the relationships proposed in Figure 1. Available data allowed only for a partial test of the model. Specifically, I attempted to explain the adoption of cost containment policies by (1) external environmental factors and a hospital's involvement with these factors, (2) certain hospital characteristics related to size and efficiency, and (3) influence of chief administrators and of physicians through serving on hospitals' governing boards. As the model in Figure 1 shows, external environmental and hospital characteristics affect adoption of policies only through the decisions and preferences of the administrative and clinical staffs, although the relationship tested here is a direct one. Also, the influence of clinical staffs on policy adoption is modest compared with that of general administrators and their staffs. Strong clinical staff influence comes later, when adopted policies must be implemented. However, since administrators know cost containment policies are unlikely to be implemented fully without the approval of clinicians, their formulation of policies and their decisions on adoption are likely to be affected by what they feel the clinical staff will accept. Since I had no data on the extent to which policies that respondents said had been implemented actually had been implemented, the study did not test the proposed link between policy adoption and implementation. Thus, consistent with Beyer and Trice's (1978: 9) criticism of some of the implementation literature, this study is most appropriately viewed as a study of policy adoption. Ties to subsequent implementation are based on inference, not on empirical findings. Finally, although the model suggests causal relationships, I could not establish causality since the data are cross-sectional.

MEASUREMENT AND METHODS

Sample

The study reported here analyzes data from three surveys conducted by the American Hospital Association (A.H.A.). Although A.H.A. data have at times been criticized (Alford, 1974), they remain the major source of statistics on individual hospitals and have been used extensively by organizational researchers (Evan & Klemm, 1980; Fennell, 1980; Heydebrand, 1973; Roos et al., 1974; Rushing, 1974; Schermerhorn & Shirland, 1981; Zald & Hair, 1972).

The primary source of the data on hospitals that the A.H.A. collects is its Annual Survey of Hospitals. Representatives of most of the nearly 6,000 community hospitals⁴ in the United States complete this yearly questionnaire, which seeks extensive information about services, personnel, patients, and administration. The A.H.A. often sends other special surveys to samples of hospitals when particular issues need to be addressed. This study employed

⁴ These include both for-profit and not-for-profit hospitals.

data collected from the 1981 Annual Survey and two such special surveys, one examining issues surrounding hospital regulation and the other focusing on hospital administration. Chief hospital administrators completed at least part of all these surveys; however, members of administrative staffs could complete many of the questions requesting statistics and general information. All data collection occurred during late 1981 and early 1982.

Since the two special surveys used different samples of the entire national population of community hospitals, each randomly selected within each state, combining all three surveys reduced the sample for this study to 328. After I eliminated 8 hospitals because of their for-profit status and 10 more owing to large amounts of missing data, 310 remained for analysis. Missing data on some variables reduced the sample further to 303. These hospitals represent a 6 percent national sample of the 5,084 not-for-profit community hospitals, defined as nonfederal government-owned, religiously affiliated, or voluntary short-term general hospitals operating in the United States during 1981 (American Hospital Association, 1982). The sample for this study differs somewhat from the population of not-for-profit community hospitals along a number of dimensions for which population data were available. Specifically, hospitals in this sample were somewhat smaller (171.9 beds vs. 180.2 beds) and somewhat more likely to be affiliated with multihospital systems (26.6 vs. 22.6%), and the sample included fewer nonfederal government hospitals (32.2 vs. 35.3%) than the population of not-for-profit hospitals from which it was drawn.

Dependent Variable

The single dependent variable, the number of cost containment policies hospitals claimed to have implemented, was measured on a scale listing 4 policies that I chose from an initial list of 12. The A.H.A. survey asked chief administrators, "Has your hospital implemented the following program or policy?" Below this question were descriptions of 12 policies, with yes or no responses required. Because the question did not examine the extent of implementation, I considered affirmative responses to indicate only the adoption of policies. As Beyer and Trice (1978) suggested, if a policy has been implemented at all, it must first have been adopted.

In developing the scale for this study, I eliminated four of the original policies immediately because they had little or nothing to do with cost containment. Of the eight remaining policies, three were eliminated because nearly all hospitals in the sample had adopted them. These were (1) use of the hospitals' own formulary, competitive bidding, or long-term contracts for acquisition and purchase of drugs (96% adoption), (2) use of competitive bidding or long-term contracts for purchase of medical supplies (95%), and (3) the use of competitive bidding or long-term contracts for purchase of diagnostic and treatment equipment (93%). Relatively few hospitals (29%) had adopted a fourth cost containment policy, one establishing limits or reducing existing limits on the volume of free or charitable care. Since

this policy also was unrelated statistically to adoption of any of the four remaining policies, it was not used.

The final scale consisted of the following four policies. *Preadmission testing* involves administering necessary tests to patients prior to their admission to a hospital; it is usually used for elective surgery cases. This policy should reduce patients' and insurers' costs since patients are not hospitalized, and hospitals benefit by freeing up beds and other facilities for more seriously ill patients (Dumbaugh & Neuhauser, 1976). *Physicians' ordering drugs by generic names* makes the cost of drugs lower than when they specify brand names. *Formal policies to require departments not to exceed pre-established budgets* help control costs by forcing departments to think frequently about costs and by enabling general hospital management to plan more effectively. Finally, *through use of techniques designed to forecast for nursing staff requirements*, hospital management can make optimal use of available facilities and employees, thus minimizing expenses.

On average, each of these four policies was adopted by almost exactly half the hospitals in the sample (51%), suggesting the general importance of these particular policies to hospitals, but also that their adoption was not so commonplace that it would be of little value to understand why some hospitals were more likely than others to adopt them. Although all interitem correlations for the four measures were statistically significant, the mean correlation among scale items was relatively low ($r = .20, p < .001$), casting some doubt on the contention that all four policies should be considered as a single measure. Nonetheless, all were significantly and positively correlated and all are policies that, if adopted and implemented, could help control or reduce hospital costs. In addition, although the four measures assess different approaches to cost containment, I decided that one broad measure of policy adoption that could encompass other policies related to cost containment would be a more useful focus for an exploratory study such as this than a focus on adoption of four individual policies from which it might be less possible to generalize. Certainly the four items that compose the scale do not encompass all possible cost containment measures. Nonetheless, they appear to be representative of a broader range of policies that most hospitals might consider adopting and that would be likely to have an effect on patient-related and clinical aspects of hospital operations. The Cronbach's alpha of .50 for the final 4-item scale is acceptable for exploratory research (Nunnally, 1967). Responses for the scale could and did range from 0, adoption of none of the four policies, to 4, all policies adopted, with a mean of 2.02. The Appendix gives a full description of the scale.

Independent Variables

Full descriptions of all of the following variables appear in the Appendix. External involvement was measured in three ways. First, response to external regulation was assessed in terms of time spent dealing with each of the two major aspects of regulation in most states, certificate of need and rate review programs. The A.H.A. survey from which data were drawn asked

chief administrators to estimate the number of person-days they and people in eight other relevant positions had spent on these programs during the most recent fiscal year. This figure should indicate the extent to which a hospital dealt with these regulatory pressures. Both certificate of need and rate review programs arose from need to control the costs of health care, so they are appropriate forms of regulation to consider as having potential effects on hospitals' adoption of cost containment policies.

The second measure of external involvement was called cooperative interorganizational involvement. Chief administrators were asked to indicate whether or not they were currently sharing up to 15 different clinical or administrative services with other hospitals. The third measure of external involvement was a dichotomous variable entitled external orientation. As in Pfeffer's (1973) study, hospitals were coded 0 if they were either government-owned or religiously affiliated and 1 if they were private voluntary hospitals.

To provide data to test the second hypothesis, three hospital characteristics were measured. As in most hospital studies, size was the average number of beds in use or available for use during the year prior to data collection. The second characteristic, occupancy rate, was the average number of occupied beds as a percentage of total available beds. The third was a measure of average length of patients' stays adjusted for severity of illness. Specifically, I multiplied average length of stay by the percentage of total inpatient days not spent in intensive care. Thus, for hospitals that dealt with many severe illnesses, operations, and accidents, the average length of stay, which might otherwise be quite high, would be reduced to reflect severity. Hospitals with few patients in intensive care would experience little change in their length-of-stay figure. Adjusting for severity makes it easier to compare these figures and to make tentative assessments of relative efficiency in processing patients. The mean adjusted average length of stay was 8.64 days; prior to adjustment, the mean was 9.03 days.

The last two hypotheses concern the effects of board composition on policy decisions. To provide data to test Hypothesis 3, I differentiated hospitals in which chief administrators served on governing boards from all others to obtain a measure of their potential influence through involvement in board decisions. Since any number of physicians could serve on a hospital's board, and I considered large proportions of physicians more likely to inhibit adoption of cost containment policies than small ones, I used the percentage of physicians relative to all other board members to test Hypothesis 4.

RESULTS

Table 1 presents means, standard deviations, and intercorrelations of all variables. The four hypotheses were tested first rather generally, with zero-order correlations, and then more rigorously, with multiple regression analysis. The correlations presented in Table 1 are evidence of substantial support for the first three hypotheses. Findings did not support the fourth

TABLE 1
Means, Standard Deviations, and Intercorrelations for All Variables^a

Variables	Means	Standard Deviations	1	2	3	4	5	6	7	8
External involvement										
1. Response to external regulation	116.29	153.49								
2. Cooperative inter-organizational involvement	3.58	2.70	.08							
3. External orientation	0.50	0.50	.06	.00						
Hospital characteristics										
4. Number of beds	171.88	161.59	.36**	.08	.06					
5. Occupancy rate	0.70	0.16	.32**	.04	.13**	.56**				
6. Length of stay ^b	8.64	7.60	-.08	-.01	-.08	-.08	.15**			
Influence over policies										
7. Chief administrator on board	0.36	0.48	.21**	.09	.22**	.35**	.31**	-.13**		
8. Physicians on board	0.09	0.10	.06	.01	.09	.21**	.16**	-.18**	.25**	
Dependent variable										
9. Adoption of cost containment policies	2.02	1.25	.25**	.19**	.18**	.33**	.29**	-.15**	.28**	.12**

^a n = 303.

^b Length was adjusted for severity of illness.

* p < .05

** p < .01

hypothesis, although a modest relationship opposite to the direction predicted did emerge.

Using multiple regression analysis yielded results generally consistent with those reported in Table 1. For the equation as a whole, the findings lend reasonably strong support to the idea that external involvement, hospital characteristics related to size and efficiency, and chief administrators' influence through representation on governing boards can be helpful in predicting hospitals' adoption of cost containment policies. The multiple correlation for the regression equation was .46 ($p < .001$), with the eight independent variables explaining 21 percent of the variance in adoption of these policies.

Only Hypothesis 4 received no support. Although the zero-order correlation between physicians on hospital boards and adoption of cost containment policies was statistically significant ($r = .12, p < .05$), I found no relationship at all between these two measures when controlling for the other seven independent variables. This finding indicates that having physicians serve on a hospital's board is not sufficient either to deter or encourage decisions to adopt cost containment policies. The presence of chief administrators on boards, however, does appear to be related to adoption of these policies.

Although administrators and physicians were hypothesized as having opposite effects on adoption of cost containment policies, these two measures of board influence were positively correlated ($r = .25$), indicating that

TABLE 2
Results of Multiple Regression Analyses for Hypothesized Predictors of Adoption of Cost Containment Policies^a

Independent Variables	Betas	<i>b</i>	Standard Errors	<i>F</i>	Levels of Significance
External involvement					
Response to external regulation	.10	.0008	.0005	3.12	.08
Cooperative interorganizational involvement	.15	.0704	.0241	8.53	.01
External orientation	.11	.2650	.1333	3.95	.05
Hospital characteristics					
Number of beds	.15	.0011	.0005	4.90	.03
Occupancy rate	.14	.0011	.0005	4.13	.04
Length of stay	-.13	-.0212	.0091	5.46	.02
Influence over policies					
Chief administrator on board	.11	.2907	.1520	3.66	.05
Physicians on board	.00	-.0002	.6929	0.00	n.s.
Constant		.6661	.3303		
Multiple R	.46		1.1226	9.85	.001
R ²	.21				

^a $n = 303$.

the two often served on boards together. To see if the presence of both had an impact on policy adoption that was distinct from the impact of each considered individually, I constructed an interaction term and regressed it on the dependent variable along with all other independent variables.⁵ The relationship found was not significant.

For the hypothesis concerning external involvement, the strongest individual predictor of adoption of cost containment policies is the extent to which a hospital is involved with other hospitals in joint clinical or administrative services. As discussed earlier, hospital administrators often see these activities as a way of both expanding services and reducing costs (Schermerhorn & Shirland, 1981). Thus, it is not surprising that hospitals strongly involved in such externally oriented efforts to reduce costs also develop internal policies to control costs. Since no cause and effect relationships were tested here, it may be that the adoption and implementation of internal and externally oriented approaches to contain hospital costs would complement and build on each other so that cost containment efforts would permeate a broad range of hospital activities.

For Hypothesis 3, beta weights for all three hospital characteristics were significant and in the directions hypothesized. The hypothesis predicted the negative relationship between average adjusted length of patients' stays and policy adoption. Lower total costs for patients and greater efficiency occur when the lengths of patients' stays are relatively low, which enhances the likelihood that hospitals will adopt cost containment policies.

Additional Analysis

Although the results of regression analysis supported all but one of the hypotheses, the strength of the relationships found was modest. Thus, I conducted an exploratory analysis of the data to see if any additional conclusions could be made regarding adoption of cost containment policies in hospitals. Rather than reexamining the entire sample, I undertook an analysis of subsets. It seemed possible that hospitals having certain combinations of characteristics described by this study's independent variables would adopt many cost containment policies, and that hospitals with somewhat different, but not necessarily opposite, combinations of characteristics would adopt very few such policies.

A breakdown procedure from the Statistical Package for the Social Sciences (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975) was used to test this idea. I coded responses on all measures of independent variables as 0 if they were below the median for that variable, or 1 if they were above the median. Those variables originally coded as 0 or 1 remained unchanged. The procedure first divides the entire sample into a high and a low group on the basis of the code for the first independent variable entered. These two subsamples are then further broken down using the high or low code for the second independent variable entered, then the third, and so on. For each subgroup,

⁵ I am grateful to an anonymous *AMJ* reviewer for making this suggestion.

means and standard deviations of the dependent variable—in this case, adoption of cost containment policies—are printed in the computer output as well as the size of the subgroup. Because subgroups get small very quickly as variables are added, I entered only four independent variables in any one series. In addition, to ensure that results could be interpreted in a meaningful way, I did not consider subgroups of fewer than 50 hospitals.

Because hospital size was the strongest correlate of the dependent variable ($r = .33$), I always entered it first in the breakdown analysis, followed by various combinations of any three of the other independent variables. In general, I found the greatest discrimination when entering variables that were correlated with the dependent variable but only weakly correlated with the other independent variables entered.

Overall, the best breakdown analysis was achieved when the independent variables entered were number of beds, physicians' representation on the board, cooperative interorganizational involvement, and average length of stay. Table 3 presents a summary of the key findings from this analysis. No other combination of independent variables produced as large a discrepancy in mean scores for policy adoption with such large subgroups.

Hospitals that were small with no representation of physicians on their boards and low levels of cooperative interorganizational involvement adopted few of the four cost containment policies measured; the mean was 1.2. In the total sample, 55 hospitals had this combination of characteristics. When hospitals also had high average lengths of stay for patients, they adopted even fewer (mean = .96) cost containment policies; there were only 24 hospitals with this combination of four characteristics, however. (This finding is

TABLE 3
Results of Breakdown Analysis for Adoption of Cost Containment Policies^a

Independent Variables	Subgroups	Subgroups' Sizes	Policy Adoption	
			Means ^b	Standard Deviations
Sample		303	2.02	1.25
Number of beds	low	150	1.61	1.19
Physicians on board	low	85	1.42	1.17
Cooperative interorganizational involvement	low	55	1.20	1.03
Number of beds	high	153	2.42	1.18
Physicians on board	high	122	2.49	1.18
Length of stay	high	76	2.68	1.09

^a Only results for subgroups producing the lowest and highest mean scores for policy adoption and including at least 50 hospitals are reported. Hospitals were divided into low and high subgroups on the basis of their ratings for each of the independent variables listed; subgroups get smaller with each breakdown since each step in the procedure divides the previous group into low and high subgroups.

^b The difference between the low mean score of 1.20 and the high mean score of 2.68 is statistically significant using a *t*-test ($p < .001$).

not shown in table.) In contrast, levels of policy adoption were high (mean = 2.68) among a group of 76 hospitals that were large, had physicians serving on their boards, and had high average lengths of stay for patients. The extent of cooperative interorganizational involvement for these hospitals resulted in almost no change in their levels of policy adoption.

Overall, the findings from this exploratory analysis support the results of the regression analysis only for hospital size, and they support the correlational findings for both size and physicians' representation on the board. These more frequently used analytical approaches, especially multiple regression, are useful for uncovering broad linear relationships in data. As the breakdown analysis demonstrates, however, certain important pockets of relationships may exist that can be discovered by deeper probing. In the process of uncovering certain combinations of characteristics that best identify low and high levels of adoption of cost containment policies, this secondary analysis showed that cooperative interorganizational involvement is mostly important for explaining only low levels of policy adoption and that relatively long average lengths of patients' stays are likely for hospitals with both the highest and the lowest levels of policy adoption.

DISCUSSION AND CONCLUSIONS

The adoption of policies related to cost containment has been extremely important for hospitals as an administrative response to pressures to control costs. If anything, in the years since the data reported here were collected, these pressures have become even more intense owing to recent government decisions to base Medicare funding to hospitals not on cost reimbursement but on preestablished fees for specific procedures known as diagnosis related groups. Further, it is likely that private insurers will eventually adopt this form of reimbursement as well (Crawford & Fottler, 1985). Confronted with reducing or eliminating any financial surplus or with reducing operations or even going out of business entirely, hospitals have had to find ways to increase revenues where possible and to control or reduce costs (Schulz & Johnson, 1983). The findings reported here generally demonstrate that measures of a hospital's involvement in its external environment, its size and efficiency, and its chief administrator's influence through representation on its governing board can at least partially explain the extent of adoption of cost containment policies.

The study has been a first step in the development of a general theory of policy adoption and implementation in hospitals. These data concern direct, noncausal relationships between external environmental factors, certain hospital characteristics, influence over policies, and adoption of cost containment policies. Obviously, other relationships depicted in the model developed to guide this study (Figure 1) need to be measured and tested before the entire process can be understood in full. In particular, the extent to which hospitals actually implement adopted policies needs to be examined more closely. This is especially important for studies of cost containment

policies since the physicians who must implement such policies are not typically subject to direct control by those who make the policies, the chief administrators and their staffs. Given the nonmanagerial, micro health care perspective of most clinical staff members (Scott, 1982), it may be that the factors related to their acceptance of cost containment policies are somewhat different from those measured here.

Further, the generalizability of this study's findings to for-profit or proprietary hospitals is unclear. Despite the general assumption that proprietary hospitals are more cost-conscious and more efficiently managed than their not-for-profit counterparts, a recent research study by the National Academy of Sciences has not shown this to be the case (Pear, 1986). The profitability of many of these investor-owned hospitals often comes not from their greater operating efficiencies but from charging higher prices and providing less charitable care than not-for-profit hospitals. Thus, many of the pressures to contain costs measured and tested here may not be relevant when studying for-profit hospitals.

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APPENDIX

Adoption of Cost Containment Policies

Chief administrators were asked; "Has your hospital implemented the following program or policy: (a) Preadmission testing? (b) Physician ordering of drugs by generic name rather than brand name? (c) Formal policy to require departments not to exceed pre-established departmental budgets? (d) Techniques designed to forecast nurse staffing requirements by unit for the next 6-12 months?"

Responses to each item were coded 1 if yes and 0 if no. Means for each item in the order listed = .53, .44, .47, and .58; standard deviations = .50, .50, .50, and .49. For the sum of the four items, mean = 2.02, s.d. = 1.25; mean interitem correlation = .20, $p < .001$, $\alpha = .50$.

External Involvement

1. Response to external regulation. Chief administrators were asked, "Please estimate the number of person-days that each of the following persons devoted to dealing with your state's certificate of need and rate review programs during FY 1980: (a) chief executive officer, (b) associate administrator, (c) assistant administrator, (d) director of planning, (e) chief financial officer, (f) chief of medical staff, (g) hospital legal counsel, (h) department heads, (i) all other."

Responses for each type of regulation for each person were summed.

2. Cooperative interorganizational involvement. Chief administrators were asked, "Is your hospital currently sharing the following services?"

Shared Clinical Services—(a) shared laboratory/pathology; (b) shared diagnostic or therapeutic x-ray; (c) shared pharmacy (full- or part-time); (d) shared emergency room services; (e) shared medical staff; (f) shared blood banks; (g) consolidation of obstetrics, pediatrics, or maternity services; (h) other shared clinical support services.

Shared Administrative Services—(i) shared consultant services; (j) joint planning with other hospitals; (k) joint review with other hospitals of submissions to external agency for budget/rate review.

Other Shared Support Services—(l) shared laundry/linen; (m) shared purchasing (drugs and/or medical supplies); (n) shared electronic data processing; (o) other shared support (nonclinical services).

For each item, 1 = yes and 0 = no. Responses to all 15 items were summed.

3. External orientation. Private, voluntary (not-for-profit) hospitals were coded 1. Government-owned (nonfederal) or religiously affiliated hospitals were coded 0.

Hospital Characteristics

4. Number of beds. Average number of beds set up and staffed for use during the reporting period, October 1, 1980–September 30, 1981.
5. Occupancy rate. Average number of occupied beds \div average number of available beds.
6. Length of stay, adjusted for severity. Average length of stay \times percentage of total inpatient days not spent in intensive care unit. Average length of stay = total inpatient days \div total patients admitted.

Influence over Policies

7. Chief administrator on board. Chief administrators were asked to indicate whether or not they served on their hospital's governing board, with 1 = on the board, and 0 = not on board.
8. Physicians on board. Chief administrators were asked to indicate the number of physicians serving on their hospital's governing board. This figure was then divided by the total number of board members.

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TRADITIONAL VERSUS OPEN OFFICES: A COMPARISON OF SOCIOTECHNICAL, SOCIAL RELATIONS, AND SYMBOLIC MEANING PERSPECTIVES

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The effects of a change in an office environment from a traditional to an open-plan design were examined for government employees occupying three types of organizational positions. Differential effects across positions for perceived personal privacy, amount of work-related communication, job characteristics, and job satisfaction supported a hypothesis based on a symbolic meaning approach to explaining employees' reactions to changes in their physical work environment. Overall, the change affected professionals least and clerical and managerial staff most.

The literatures on both environmental design and behavior have extensively discussed and demonstrated the importance of environment in affecting behavior, attitudes, and perceptions (A.I.A. *Journal*, 1977; Altman, 1975; Barker & Wright, 1955; Festinger, Schachter, & Back, 1950; McGrath, 1976; Roethlisberger & Dickson, 1939; Sommer, 1969, 1972, 1974; Steele, 1973; Sundstrom, Town, Brown, Forman, & McGee, 1982; Wineman, 1982). More recently, the continued adoption of open-plan concepts in the physical design of offices has stimulated organizational research on the effects of environmental design in workplaces (Allen & Gerstberger, 1973; Brookes & Kaplan, 1972; Oldham & Brass, 1979; Oldham & Rotchford, 1983; Sundstrom, Herbert, & Brown, 1982). Findings regarding the benefits and limitations of open-plan designs, however, have not been consistent.

This study investigated differences among employees in various organizational positions regarding their perceptions of their work and physical settings as a possible explanation for the lack of consistency in previous findings. We examined the social relations and sociotechnical hypotheses Oldham and Brass (1979) proposed and extended their work by considering the roles of organizational position and status in determining employees' reactions to a change in their physical work environment. Also, because physical setting provides information about a person's social position, the physical setting of work should be a potentially important symbol of organizational status. We

The authors are grateful to the three anonymous reviewers for their help on earlier drafts.

therefore considered how well employees' reactions to an open-plan office design supported predictions based on the three—social relations, sociotechnical systems, and symbolic meaning—theoretical perspectives.

Based on the original Quickborner concept of *Burolandschaft*,¹ open-plan office designs attempt to maximize functional communication among members of office staffs by removing the traditional physical barriers that hinder the flow of work and communications (Pile, 1976). Although many variations of the original concept have evolved, an absence of floor-to-ceiling walls is the primary characteristic of open-plan offices. Instead, arrangements of partitions, screens, office equipment, or plants delineate individual and functional work areas.

Proponents of open-plan offices claim that these designs increase work efficiency and communication, enhance working conditions, and lower operating costs (*A.I.A. Journal*, 1977; Duffy, 1969; Kubzansky, 1982; Pile, 1976). Support for these claims has not, however, been consistent. For example, adoption of open-plan office designs has increased communications and positive reactions toward work environments among employees (Allen & Gerstberger, 1973; Boyce, 1974; Canty, 1977; Goodrich, 1978; *Progressive Architecture*, 1969; Riland & Falk, 1972; Zeitlan, 1969), but has also decreased work satisfaction, involvement, work motivation (Dean, 1977; Marans & Spreckelmeyer, 1982; Oldham & Brass, 1979), satisfaction with office aesthetics (Brookes & Kaplan, 1972; Nemecek & Grandjean, 1973; Sommer, 1974), and perceived privacy (Becker, 1981).

Social Relations and Sociotechnical Systems Explanations

Oldham and Brass (1979) suggested that the effects of open-plan offices could be examined from either a social relations or a sociotechnical perspective. In the social relations view, an environment acts like a catalyst affecting the quality and level of social interactions and communications among its inhabitants (Byrne & Buehler, 1955; Festinger et al., 1950; Kipnis, 1960). For example, physical proximity can provide many opportunities for the development of interpersonal relationships (Homans, 1950), which may result in high interpersonal attraction, satisfaction, and motivation.

According to this perspective, replacing a traditional office plan with an open-plan design should enhance an environment for employees at all organizational levels. The many opportunities for interaction such an office provides should result in frequent work-related communications, both initiated and received, positive perceptions of interpersonal relations with other employees, and high job satisfaction and trust in management. These are all characteristics of environmental favorability. A high level of trust should also characterize a favorable organizational climate with positive interpersonal relations occurring at all organizational levels.

¹ The Quickborner concept or theory refers to the approach to office planning developed by Eberhard and Wolfgang Schnelle, two German management consultants whose consulting group was named the Quickborner Team. They referred to their theory of open-office design as *Burolandschaft*, or landscaped office.

Hypothesis 1: Change from a traditional to an open-plan office design will improve interpersonal relations and increase job satisfaction, trust in top administration, and work-related communications among employees at all organizational levels.

From a sociotechnical systems perspective, employees' work experiences vary with the technical and social systems that exist at work. Traditional, enclosed offices provide private, identifiable, and defensible work areas that make up the physical and personal boundaries of an employee's work. Removing physical boundaries is likely to diminish perceived personal privacy and opportunities for close interpersonal relationships and result in perceived loss of control over space and personal work boundaries.

In their study of newspaper employees, Oldham and Brass (1979) found greater support for the sociotechnical than for the social relations perspective: satisfaction, motivation, and perceived task identity decreased following the adoption of an open-plan design. They concluded that the absence of physical boundaries engenders a sense of communal ownership and relatively lower personal identification with work. We suggest that the absence of physical barriers will give individuals a broader and more complete view of their work in relation to the general flow of all work in an office than they would have in a traditional design because open-plan offices increase the availability of information about others' work. Rather than sharing ownership of the work, employees in open-plan offices should more clearly distinguish their work from that of others. We expect, then, that employees will more closely identify with their work, perceiving it as a complete unit, when they perform it in an open-plan office rather than in a traditional, enclosed office.

As interpreted by Oldham and Brass, the sociotechnical perspective predicts an overall negative reaction from employees to the adoption of an open-plan office as a result of decreased autonomy, task identity, and feedback from others regarding their work performance. However, our interpretation of this theoretical perspective suggests both positive and negative reactions.

Hypothesis 2: Employees who move from traditional, enclosed offices to open offices will experience a decrease in perceived personal privacy but an increase in task identity.

Symbolic Meaning Explanations

In their explanations of the effects of open-plan offices, Becker (1981) and others (Geran, 1973; Rapoport, 1982; Steele, 1973) pointed out that work environments not only support the work activities of those who use them, but also communicate information symbolically. Environmental symbols represent the social order and individuals' places in it. In traditional office environments, for example, office design and furnishings convey information about organizational status (Campbell, Dunnette, Lawler, & Weick, 1970), thereby helping regulate interpersonal behavior across organizational levels.

Open-plan offices can change the degree of status associated with many symbols by distributing them to all employees. Although such democratization of a physical environment may improve a work setting for rank-and-file employees, it is also likely to result in the loss of environmental symbols of status for employees at higher levels. Environmental cues that once communicated, reinforced, and legitimized individual differences in formal authority, activities, or competencies lose their meaning when all employees possess them. Differentiation by position and formal authority remains, but with a new set of symbols.

From this perspective on office design, organizational position should be important in determining employees' actual and expected physical settings and in influencing their reactions to a change in physical work setting. On the one hand, individuals with high status because of their competencies or formal authority may perceive a symbolic loss of status with a change to an open-plan office and may react negatively. Their work environment and its symbols should have great importance for these individuals. On the other hand, individuals with less status should react positively to acquiring previously unattainable perquisites as the result of a change to an open-plan office; these may include carpeting, art work, and new office furnishings that often are themselves state-of-the-art designs. Whereas the social relations and sociotechnical approaches predict similar reactions for all employees affected by environmental changes, the symbolic meaning approach suggests differential reactions for individuals with different organizational statuses when changes in a physical setting result in losses or gains in environmental symbols of status across organizational positions.

Hypothesis 3: Employees' reactions to a change in office environment from traditional to open-plan design will vary by status and organizational position. Employees in positions with high status will report a less favorable physical setting, less positive perceptions of their jobs' characteristics, less work satisfaction, and less perceived privacy in their new, open environment than they reported in their old, traditional environment. Employees in positions with low organizational status will report a more favorable physical setting, more positive perceptions of their jobs, greater work satisfaction, and more privacy in their new environment than they had in the old environment.

METHODS

Overview

Workers employed by a government agency in a midwestern state were surveyed about their perceptions of and attitude toward their work and work environment both before and after a move to an open-plan office. The move occurred over a period of five months. We administered the pre-move survey ten months before the move started and the post-move survey six months

after the last group was relocated into the new environment. Figure 1 graphically illustrates the period covered by the move and the survey administrations. Prior to the move, employees in the agency's 26 departments occupied offices that varied in design from traditional to partially open.

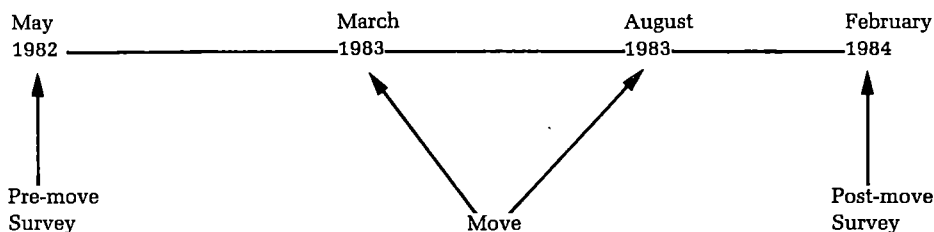
The agency's top management proposed the investigation to one of us. Items that appeared in the agency's newsletter well before administration of the first questionnaire made employees aware of the study's purpose of examining the effect of the environmental change on the agency's climate and functioning. A cover letter attached to both questionnaires restated the study's purpose and addressed confidentiality of responses. Each respondent received an identification number to allow matching of pre- and post-move responses. Both the cover letter and the researchers assured employees that no information would be provided to the agency that could identify any individual's responses.

Respondents

Approximately half of the agency's local workforce participated in the study. Time and financial constraints prohibited surveying the entire workforce. We selected departments randomly and surveyed all employees in the departments chosen, thus obtaining 472 potential respondents from 14 departments. Employees took the pre-move surveys, which required approximately 40 minutes to complete, in groups. We obtained usable surveys from 426 employees, 61 percent of whom were women.² Job tenure and organizational tenure averaged 5.3 years (s.d. = 4.6) and 8.6 years (s.d. = 6.0), respectively.

The second survey administration occurred from 6 to 11 months after the move began. The shortest post-move assessment occurred 6 months after the last group had moved into the new offices. Transfers—typically, to a department not in the sample—terminations, and retirements during the period covered by the study reduced the available post-move sample of individu-

FIGURE 1
Period Covered by Move and Survey Administrations



² Pre-move subsample sizes were 190, 147, and 89 for the clerical, professional, and managerial groups, respectively.

als to 372, 79 percent of the original 472 potential respondents. We obtained usable surveys from 247 employees in this group, or 66 percent.

Comparisons between the 247 employees who completed both the pre- and post-move surveys and the 179 employees who completed only the first revealed no differences between the two groups on either demographic characteristics or responses to the pre-move dependent measures. Both groups were represented proportionately across gender (60% and 61% women), civil service classifications, average job tenure (5.3 years for both groups), and average organizational tenure (8.8 and 8.3 years). A repeated-measures MANOVA yielded a nonsignificant multivariate F for group ($F_{13,320} = .84$), indicating no differences between the retained and eliminated groups across all of the dependent measures. Both the pre- and post-move samples represented all civil service grade levels.

Research Site and Office Environments

Prior to the move, employees were housed in 13 separate rental buildings within an urban area. Office furnishings at these locations were an assortment of state civil service issue that had accumulated over several decades. Problems with heating, ventilation, and air conditioning existed in several buildings. In addition, the quality of lighting, level of exterior and interior noise, adequacy of parking facilities, and level of physical safety varied across locations. Interdepartmental communication in the form of face-to-face meetings required traveling, usually on foot, throughout the city.

In the floor plans for the agency's old buildings, corridors lined with doors led to bays with enclosed offices on their perimeters. Some of the bays were sectioned with partitions or file cabinets, but the majority were simply open areas filled with desks occupied by the clerical staff. Most of the professionals—90 percent—and all of the managers and administrators occupied conventional, enclosed-perimeter offices; organizational level or position determined an office's size and furnishings.

The agency undertook the move to bring its staff into a single location, expecting to decrease operating costs and increase its efficiency. The move consolidated the departments on three floors of a new office building that were designed as open-plan office environments. Sound-absorbent partitions of eye-level height created workspaces in the new building. Except for the presence of supporting columns and of the elevators, which were centrally located on each floor, the sight line from each workspace was uninterrupted.

Top agency administrators, 8 percent of the managers surveyed, retained enclosed offices located either along interior walls near the elevator cores or along exterior walls. The remaining employees were assigned work areas in the partitioned spaces; they were grouped by departments, as they had been in their previous locations, and departments were grouped by function. With few exceptions, the average space for each employee both before and after the move was approximately 130 square feet, with most of the losses and gains occurring for those retaining enclosed offices.

Employees had been aware of the intended move prior to the pre-move survey. Before its administration, the agency announced a proposed reduction in workforce size, to be accomplished through a freeze on hiring, introduction of an early retirement program, and a reorganization. This workforce reduction affected none of the employees in the sample. The reorganization had minor effects on them and marginally affected organizational positions. The most noticeable effect of the changes was the loss of some participants through interdepartmental transfers. Both the workforce reduction and reorganization were completed before the move took place.

Measures

Employees were classified into three positional groups—clerical, professional, and managerial—on the basis of their civil service classification. The clerical group contained the clerical and secretarial staffs ($n = 109$),³ and represented the lowest ranks in the organizational hierarchy. Jobs classified in this category included general clerk, data encoder, word processor, library assistant, and computer operator. The professional group contained non-managerial professionals whose positions required advanced college degrees or specialized training or skills ($n = 88$). This group represented the organization's middle ranks and contained positions such as research consultant, data systems analyst, case specialist, and program development specialist. Finally, the managerial group, representing the highest organizational ranks, contained all managerial levels and some administrators ($n = 50$). Job titles in this classification included department administrator, financial manager, accounting executive, area director, and data systems manager. As is typical of most organizations, organizational position was significantly related to gender ($r = .62$). Most clerical employees were women (95%), and most managers were men (85%). Men and women were more equally represented among the professionals (men = 62%).

Measures of perceived physical setting were used instead of actual measures of physical elements of the work setting for two reasons. First, individuals occupying the same physical setting often perceive it quite differently (Goodrich, 1982). Second, the perceived situation often has a greater effect on individuals than does the objective situation (Campbell et al., 1970). Except for the job characteristics measures, we presented identical items at both administrations. Scale composition was determined by interitem correlations and rational grouping of items by content. The complete scales for both questionnaires appear in the Appendix.

Items measuring perceptions of work area's adequacy and personal privacy in the work setting were adapted from Goodrich (1978). The seven items measuring the physical setting assessed adequacy of workspace in terms of lighting, size, temperature, equipment, and distance from work-relevant co-workers and facilities. Seven items also assessed level of per-

³ Subsample sizes in this paragraph are for the post-move sample of 247 employees.

ceived personal privacy; these included feeling free to discuss private matters without being overheard and difficulty in concentrating on work.

We tapped interpersonal relations with co-workers using items developed from open-ended interviews conducted with 40 employees before the pre-move survey. These six items included ease of communication in the department, feelings of group membership, and perceived level of quarreling among departmental members. Responses indicating high perceived adequacy of work area and personal privacy and positive perceptions of interpersonal relations indicated that employees saw their environment as favorable.

Job characteristics were assessed before the move with the Job Characteristics Inventory (JCI) (Sims, Szilagyi, & Keller, 1976) and after the move with job characteristics scales from the Michigan Organizational Assessment Questionnaire (MOAQ) (Seashore, 1964).⁴ Both assessments included six items measuring task identity, feedback, and autonomy. Trust and satisfaction were also measured with items from the MOAQ. Again, high responses on these scales indicated perceived environmental favorability. To assess the extent of the interpersonal communication within the agency, we asked respondents to estimate the number of information requests they received and the number of information requests they initiated weekly.

Table 1 presents means, standard deviations, internal consistency reliabilities, and interscale correlations for the resulting scales. Reliabilities ranged from .71 for the post-move measure of trust to .87 for the pre-move measure of job satisfaction, values we considered adequate for combining the related items into scales. Because of the significant intercorrelations among scales, we used multivariate methods for data analysis.

Analyses

A repeated measures multivariate analysis of variance (MANOVA) followed by univariate analyses (ANOVAs) were performed to determine the effects of the change in the office environment on the attitudes and perceptions of employees in three different organizational positions. Independent variables used in the MANOVA were (1) organizational position, whether clerical, professional, or managerial, and (2) change in the office as represented by contrasts between pre-move and post-move data. Dependent variables were the scale scores representing perceived adequacy of work area, personal privacy, interpersonal relations, job characteristics, trust, satisfaction, information requests received, and information requests initiated. Because of the strong relationships of gender and organizational tenure with organizational position ($r = .61$ and $r = .35$), we also performed covariance analyses (ANCOVAs) on the dependent variables to assess the effects of position with

⁴ The change in the job characteristics measures from the first to the second data collection was prompted by management's concern over the questionnaire's length for the second administration. The MOAQ items tapped constructs similar to those of the JCI, but required less space. Use of the MOAQ at the second questionnaire administration allowed collection of post-move measures on all of the scales for which we had obtained pre-move measures.

TABLE 1
Means, Standard Deviations, Internal Consistency Reliabilities, and
Interscale Correlations^a

Variables ^b	Means	Standard Deviations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Pre-move																		
1. Work area's adequacy (7)	33.1	6.8	(72)															
2. Privacy (7)	28.1	9.6	42	(86)														
3. Interpersonal relations (6)	26.7	8.2	42	37	(83)													
4. Job characteristics (6)	40.4	7.0	09	18	24	(75)												
5. Trust (2)	7.8	3.1	23	24	49	23	(77)											
6. Satisfaction (3)	16.8	3.5	24	25	42	45	44	(87)										
7. Information requests received (2)	42.9	47.9	-01	-02	06	21	01	08	-									
8. Information requests initiated (2)	25.9	30.9	08	07	17	12	10	18	67	-								
Post-move																		
9. Work area's adequacy	33.7	10.0	16	09	12	04	16	16	08	08	(83)							
10. Privacy	27.5	6.8	12	15	17	14	20	22	04	06	43	(83)						
11. Interpersonal relations	27.5	6.9	19	22	39	20	21	40	14	22	26	24	(81)					
12. Job characteristics	40.6	11.2	14	08	25	43	24	39	19	14	17	22	46	(86)				
13. Trust	6.6	3.6	21	17	33	17	41	27	04	04	23	24	41	30	(71)			
14. Satisfaction	16.0	4.8	16	16	33	23	24	53	11	12	34	24	55	34	34	(85)		
15. Information requests received	40.5	46.1	-09	-01	04	11	05	14	42	36	06	09	20	17	08	07	-	
16. Information requests initiated	21.6	25.2	06	07	-00	04	-07	03	24	33	02	07	17	-01	08	04	68	-

^a For $r \geq .11$, $p < .05$; $n = 246$. Internal consistency reliabilities are in parentheses on diagonal.

^b Numbers in parentheses indicate numbers of items in the scale.

gender and tenure controlled. Following Oldham and Brass (1979), we also conducted covariance analyses while controlling for the effects of the specific job characteristics, an analysis intended to show to what extent the effects of environmental change on employees' reactions were actually due to changes in their jobs rather than to the change in office design.

RESULTS

Results of the MANOVA revealed significant overall F s for position ($F_{18,472} = 4.22, p < .01$), change in the office ($F_{9,236} = 119.95, p < .01$), and their interaction ($F_{18,472} = 3.85, p < .01$) and indicated that employees' reactions were significantly different across the set of dependent variables.

The first issue relevant to this study was whether the change in the office resulted in an actual change in employees' perceptions of their physical work environment and if the change was perceived differently across positional groups. The group means and univariate F s presented in Table 2 show no main effects for office change or organizational position for the measure of physical environment, work area's adequacy. The interaction between office change and position, however, was significant, indicating that employees in different organizational positions perceived the physical environment differently.

The group means, illustrated in Figure 2a, indicate that pre-move differences evident among the groups in the perceived favorability of their physical work environment were no longer apparent after the move to the open-plan office. This change was due to clerical employees reporting significantly more positive reactions to the new work environment than to the traditional environment, and managers reporting less. Employees in the professional group showed little change in how they perceived their office setting.

The second issue relevant to this study concerned changes in employees' relations to other aspects of their work environment that accompanied the change in the office. Hypothesis 1, derived from the social relations approach, predicted that the change would enhance satisfaction, trust, and interpersonal relations. As shown in Table 2, the change was associated with relatively lower satisfaction and fewer initiated information requests across positional groups. For this organization, increased opportunities for meaningful interactions across organizational positions and statuses were associated with changes in job satisfaction and frequency of communication, but not with changes in perceived interpersonal relations.

The sociotechnical perspective predicted that the change in office environment would lower perceived privacy and change perceived job characteristics. Although perceptions of privacy decreased after the change in the office environment, they were lower only for professionals and managers. As shown in Figures 2b and 2c, managers reported a significant increase in perceived task identity while clericals and professionals reported less perceived feedback about their work available to them in the open-plan environment.

TABLE 2
Results of Univariate Analyses of Variance for All Dependent Variables^a

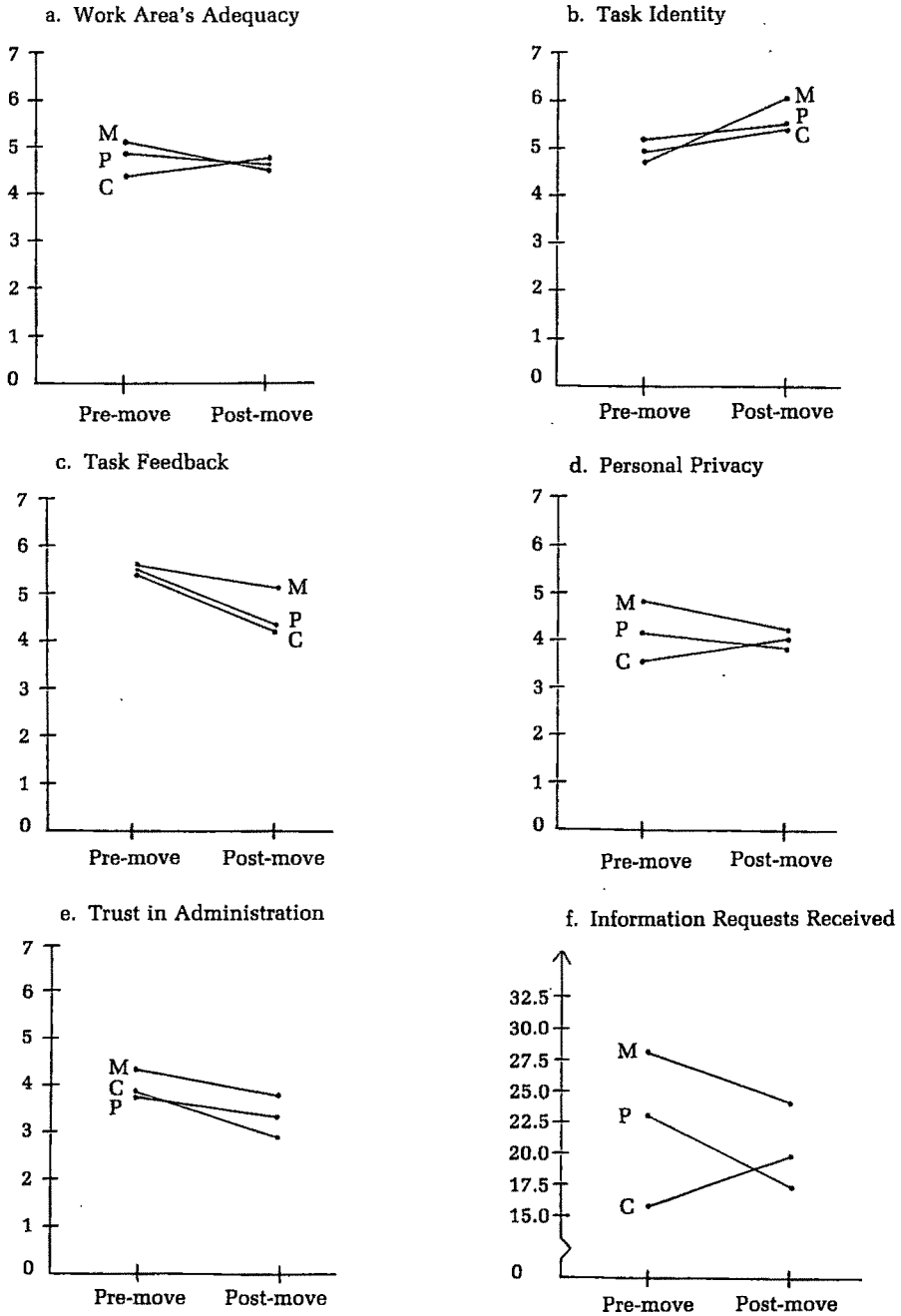
Dependent Variables	Office Change			Organizational Position			Change × Position	
	Means			Means				
	Pre-move	Post-move	F	Clerical	Professional	Managerial		F
Work area's adequacy	4.74	4.81	0.00	4.65	4.84	4.90	1.65	3.34*
Privacy	4.02	3.93	3.99*	3.79	3.92	4.47	10.67**	11.10**
Interpersonal relations	4.46	4.59	2.46	4.26	4.59	4.99	8.90**	0.15
Job characteristics	5.24	5.27	1.16	4.99	5.33	5.69	9.33**	3.65*
Feedback	5.47	4.41	65.94*	4.78	4.91	5.33	3.31*	4.15*
Task identity	4.98	5.53	26.06*	5.17	5.28	5.40	0.61	5.36*
Autonomy	4.96	5.03	0.56	4.67	5.14	5.44	7.10*	0.11
Trust	3.91	3.31	19.34**	3.37	3.64	4.10	4.82**	3.20*
Satisfaction	5.59	5.32	11.20**	5.17	5.65	5.71	5.33**	2.44
Information requests received	21.46	20.26	1.38	17.77	20.12	28.89	5.70**	3.84*
Information requests initiated	12.97	10.80	5.45*	8.80	11.71	18.93	14.85**	0.69

^a For change in office, $df = 1, 244$; for organizational position, 2, 244; for change × position, 2, 244.

* $p < .05$

** $p < .01$

FIGURE 2
Significant Interactions Between Change in Office
and Organizational Position^a



^a M = managerial, P = professional, C = clerical employees.

The symbolic meaning perspective implied that interactions between the environmental change and organizational position would effect perceptions of both job and environment. We expected employees in positions with high status to be more sensitive to their work environment and consequently to be more affected by the change. Significant changes emerged for each of the positional groups following the change in physical environment.

As expected, perceived personal privacy was lower in the open-plan than in the traditional office environment for employees in professional and managerial positions and higher for clerical employees (see Figure 2d). As depicted in Figure 2e, trust in top administration decreased across all positional groups, with the clerical staff reporting the largest decrement.

Work-related communications also varied across organizational position. Clerical employees reported a significant increase and professionals a significant decrease in information requests received as a result of the move. Although managers also reported fewer communications received following the move, their level remained significantly higher than the other two groups' (see Figure 2f).

With the exception of a change in the results for trust in top administration, analysis of covariance revealed no changes in the findings presented in Table 2 when we controlled either gender or tenure. With tenure controlled, trust in top administration remained constant across organizational position. The results of the covariance analyses controlling for perceived job characteristics also revealed little change across the dependent measures. Reported trust in top administration was again not significantly different after the move than before it for the three positional groups, but a significant interaction emerged for the satisfaction measure. With perceived job characteristics controlled, employees in clerical and managerial positions were significantly less satisfied following the environmental change than they were before it. Professionals showed no change in their levels of job satisfaction in the two data collections.

DISCUSSION

This study examined three explanations of employees' reactions to changes in their physical work environment. The social relations approach suggests a positive overall reaction; the sociotechnical approach, both positive and negative reactions; and the symbolic meanings approach, either a positive or negative reaction depending on an individual's organizational position and status. The findings generally supported the symbolic meaning perspective: among the state government employees surveyed, perceptions of the physical work environment and reactions to the change in environment varied with their organizational position. As the work of Becker (1981) and others (Campbell et al., 1970; Rapoport, 1982) suggests, the organizational status associated with a position was reflected in agency employees' actual physical settings and their reports concerning the favorability of the traditional offices. The convergence of positional group means on reported favorability of the physical environment indicated an increase in favorability

for low-status employees and a decrease for high-status employees. The likelihood of this convergence being solely the result of regression to the mean seems unlikely, given the relatively small—although significant—spread of environmental perceptions before the move and the relatively large increase in variance of environmental perceptions from before to after the move.

As indicated by the changes in perceived personal privacy, job characteristics, and job satisfaction, employees in different positions also reacted in different ways to changes in their physical work environment. Reports of less perceived personal privacy from professionals and managers are consistent with other research on the adoption of open-plan office designs. These individuals may have perceived the actual loss of their private offices, traditional symbols of organizational status, as a symbolic loss of status and the accompanying right to greater privacy.

The reported increase in perceived personal privacy among clerical workers is interesting because, overall, their accessibility was relatively constant in the two environments. Although clerical employees were still in open spaces, sound-absorbing panels demarcated their new workspaces where previously filing cabinets or nothing had served. Not only did the attractiveness of their physical work environment increase, but their actual personal privacy did also.

The difference in the measures of job characteristics used in questionnaire administration before and after the move provides one possible explanation for the differences over time in employees' perceptions about their jobs. Although the wording and content of the two measures were highly similar, they may have evoked different responses in the employees surveyed. Having used these different measures of the same job constructs, we cannot determine with certainty what effect this change in environment had on the findings for job perceptions. This study's findings on perceived changes in job characteristics did not follow sociotechnical predictions or the Oldham and Brass (1979) findings. Although the change in environment affected perceived job characteristics, they were affected in different ways among the positional groups. The increase in reported task identity suggests that the absence of physical boundaries provided employees with more information about how their work relates to the work of others. Information that allows for a highly personalized view of work may be less available or less easily obtainable in traditional, enclosed offices than in open-plan offices.

Methodological similarities and differences between the Oldham and Brass study and the present one may clarify some of the differences in findings. Certain environmental characteristics studied in the two investigations appeared quite similar; similarities include the actual workspace arrangements of both studies' old and new environments and the retention of a constant amount of space for employees when designs changed. Major differences were the organizational positions of the employees surveyed and the durations of the studies; we surveyed both supervisors and nonsupervisors, not just the latter, and we administered the post-move measure 21 months rather than 26 weeks after the first survey administration.

The significant interactions found between organizational position and change in work environment suggest that individual and organizational factors generally ignored in this type of research may influence both employees' reactions to environmental changes and the changes themselves. For example, some of the greatest changes of job characteristics perceptions occurred for clerical and managerial employees. If these changes are not due to methodological artifacts, they may have emerged because people performing different functions in organizations use different sources for their cues or information about their work. Clericals and managers may rely on cues that are external to their work, whereas professionals may use cues that are intrinsic to it.

Clerical work is generally routine and highly similar throughout organizations—file clerks, secretaries, and receptionists in one department or organization perform tasks that are nearly identical to those of their counterparts in other departments or organizations. Most managerial work is also similar across functions throughout organizations. Managers engage in decision making, planning, and employee assessment, for example, regardless of the particular department or organization in which they work. In both cases, the context in which work is performed contributes substantial information about the work itself. External sources, such as other individuals engaged in similar work, may be necessary to facilitate individuals' perceptions of task identity and the uniqueness of their own work.

Professionals, by definition, perform specialized work. The work of a professional in one department of an organization is likely to be different from the work of other professionals in an organization. For these employees, visual access to the work of others provides little additional, meaningful information about their own distinctive work. Information about the characteristics of a professional's job, then, should come from the work itself and not from comparisons made with the work of other professionals.

Given the nature of their work, clericals and managers may rely more on social comparisons with similar others (Festinger, 1954) for job information than professionals. Also, if employees in different organizational positions use different sources for their information about job characteristics, changes in the information sources might change perceptions about their jobs. In this study, providing additional sources of information through a change in the physical environment affected perceived job characteristics primarily for clerical and managerial employees. To the extent that environmental change facilitated these perceptual changes, this study provides support for Salancik and Pfeffer's (1978) propositions regarding social influences on job perceptions. It also suggests the inclusion of environmental influences for specific groups of employees in future research designs.

The importance of internal information sources is also evident when the influences of job characteristics are removed from employees' responses to environmental change. Statistically controlling for differences on perceived job characteristics across employees' positions resulted in a significant interaction for job satisfaction and environmental change. With these controls,

only clerical and managerial employees reported significantly lower satisfaction after the change, suggesting that work satisfaction may be more closely tied to perceived job characteristics for professionals than for other groups of employees, for whom factors like physical work environment may be more strongly related to overall satisfaction.

The findings reported here gave the most support to the symbolic meaning perspective proposed by Becker and others. Results for the various groups, however, did not follow its predictions. Contrary to our hypothesis, employees with the highest and the lowest organizational statuses showed the greatest reactions to environmental change. Also, the overall reactions of both these groups were neither completely positive nor completely negative. Perceived adequacy of their work areas, privacy, and information requests from others increased for the clerical staff, although their satisfaction from and feedback about their work decreased. Managers perceived their work areas as less adequate than before the office change and perceived less privacy and satisfaction, but reported increased identification with work. What cannot be ascertained from these data is whether and how the symbols of status communicated by the work environment also changed for each of the positional groups.

IMPLICATIONS FOR PRACTICE AND FUTURE RESEARCH

Overall, the results suggest that organizations should base decisions about the designs of physical work settings on careful consideration of the importance and meanings of work settings for various groups of employees. A change to a more egalitarian environment like an open-plan office may undermine an existing organizational culture and its system for communicating expectations about behavior. It may also produce unanticipated changes in how employees perceive their jobs. To the extent that the job perceptions become more positive, an environmental change may be considered successful. However, without systematic examination of when, how, and for whom perceptions about jobs change when an environment does, unintended perceptual changes may prove detrimental. This would be the case, for example, if enhancement of an employee's perceptions concerning variety of skills engendered perceived, but unmet, needs for more formal authority and responsibility and a higher salary.

Clearly, there is evidence that expected and actual work settings have symbolic value that influences employees' perceptions of their environment and their work (Becker, 1981; Sundstrom, Town, Brown, Forman, & McGee, 1982). This study suggests that environment's symbolic value may be relative to organizational position. However, other factors may also influence the importance and impact of a physical environment on employee's perceptions. For example, environments would have greater meaning for employees in very large organizations who know few people outside of their own functional areas than for employees of small organizations where everyone knows everyone else. A high need for social approval could also intensify expectations or desires for richly appointed surroundings at work.

The limitations of the present study suggest several directions for future research. First, use of a control group that experienced relatively little or no change in environmental design would strengthen a similar research design. Second, future research on changes in work environments should include organizational and personal variables, such as position and status, perceived need for privacy, importance and use of environmental symbols, and awareness of physical surroundings among the factors it investigates. Third, it appears that this study and most other investigations of changes from traditional to open-plan designs have confounded the design change with a general improvement in overall environments. Moreover, because improvements in physical settings may follow changes or improvements in managerial philosophy, the reactions of employees that studies of environmental change have measured may include reactions to both changes in physical environments and managerial changes. Closer attention to all of the changes occurring should allow stronger tests of reactions to changes in work environments. In the present study, the attractive and efficient work setting that the new environment provided stood in contrast to the generally inefficient and unattractive old setting. Employees' reactions may have reflected changes in aesthetic qualities without necessarily reflecting the change in design. Finally, rather than testing competing hypotheses about the effects of changes in physical work environments on employees, future efforts should establish the conditions under which predictions grounded in the social relations, sociotechnical, or symbolic meaning approaches should hold.

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APPENDIX

The following items composed the scales used in this study. With the exception of the job characteristics measure, scales for both questionnaire administrations were identical. The job characteristics assessed at both administrations were: autonomy (A), task identity (TI), and feedback (F). We summed employee responses to related items to create the scale scores used in the analyses. Unless otherwise noted, response alternatives were 1 = strongly disagree to 7 = strongly agree.

Work Area's Adequacy

My work area is:

- (a) adequately equipped for my work.
- (b) large enough for my needs.
- (c) adequately lighted for me.
- (d) located near personal facilities (e.g., eating areas, bathrooms, etc.).
- (e) kept at a comfortable temperature.
- (f) located close to people I need to talk with in my job.

Personal Privacy

In my work area:

- (a) I can talk privately and not be overheard.
- (b) I find it hard to concentrate on my work.
- (c) the noise level makes me irritable and uneasy.
- (d) I'm aware of others working nearby.
- (e) I'm aware of others passing nearby.

My work area provides:

- (a) the quiet I need to do my work.
- (b) the visual privacy I need to do my work.

Interpersonal Relations

In my service area/office:

- (a) it is easy to talk openly with people here.
- (b) it is easy to ask advice from anyone here.

I feel that:

- (a) there are feelings among people that tend to pull the service area/office apart.
- (b) I look forward to being with others in my service area/office each day.
- (c) there is too much bickering in my service area/office.

I really feel that I'm a part of my service area/office.

Pre-move Job Characteristics

Just doing the work required by my job gives me many chances to figure out how well I am doing. (F)

On my job, I produce a whole product or provide a complete service. (TI)

I have the freedom to decide what I do on my job. (A)

It is basically my own responsibility to decide how my job gets done. (A)

Response alternatives for the following two items were 1 = not at all to 7 = very much.

As you do your job, can you tell how well you are performing? (F)

How much does your job involve producing a complete product or providing a service yourself?

That is, to what degree do you work alone on the service from start to finish? (TI)

Post-move Job Characteristics

Response alternatives for all items were 1 = none at all/very little to 7 = very much/a great amount.

How much of the following do you have on your job?

The opportunity to find out how well I am doing in my job. (F)

The opportunity to do a job from beginning to end. (TI)

The opportunity for independent thought and action. (A)

The opportunity to complete the work I start. (TI)

The freedom to do pretty much what I want on my job. (A)

The feeling that I know whether I am performing my job well or poorly. (F)

Trust

People here feel you can trust top management.

You can believe what top management says around here.

Satisfaction

I am satisfied with my job.

I really don't like my job. (Reverse scored)

I like working here.

Information Requests Received

Responses on information requests were actual members.

How many people in your service area/office regularly ask you for information?

In an average week, how many requests for information do you receive from people in your service area/office?

Information Requests Initiated

How many people in your service area/office do you regularly ask for information?

In an average week, how many requests for information do you make of other people in your service area/office?

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CHARACTERISTICS OF WORK STATIONS AS POTENTIAL OCCUPATIONAL STRESSORS

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A field study of 109 clerical workers explored work stations' characteristics as potential occupational stressors. Contrary to predictions, intrusions from atmospheric conditions and intrusions from other employees were not consistently related to negative reactions. As predicted, however, the evidence suggested that intrusions were more strongly associated with reactions to employees' work stations than with general reactions to their work. Results also indicated that employees reporting high role overload had relatively fewer negative reactions to hotness and density. The findings provide modest support for the detachment hypothesis, which predicts that overworked employees concentrate harder on their work than other employees and ignore intrusions stemming from their physical environment.

The classic Hawthorne studies were initiated to discover the influence of illumination and other physical conditions on employees' efficiency (Roethlisberger & Dickson, 1940). The results of that research encouraged organizational theorists to focus on social-psychological variables rather than physical ones. Recent conceptual (Davis, 1984; Pfeffer, 1982) and empirical work (Oldham & Brass, 1979; Oldham & Rotchford, 1983; Szilagyi & Holland, 1980; Zalesny & Farace, 1987) has suggested, however, that the field of organizational behavior can benefit from consideration of physical variables. Furthermore, other disciplines, including human factors research (e.g., Gawron, 1984; Knave, 1984), environmental psychology (e.g., Baum & Davis, 1976; Mandel, Baron, & Fisher, 1980), and social psychology (e.g., Langer & Saegert, 1977; Worchel & Teddlie, 1976) have conducted extensive research on physical variables.

Although researchers in organizational behavior have not explicitly examined physical variables as occupational stressors, the literatures of other disciplines suggest that physical settings can be sources of pressures and constraints that negatively affect performance and well-being. Moreover,

We wish to thank Grace Chan, Cheryl Householder, James Jucker, Pamela O'Connor, and Robert Quinn for their help with this study. Portions of this paper were prepared while Robert Sutton was a fellow at the Center for Advanced Study in the Behavioral Sciences. He is grateful for financial support provided by the Carnegie Corporation of New York and the William and Flora Hewlett Foundation.

both Cannon's (1939) work on homeostasis and Selye's (1936, 1983) writings on the general adaptation syndrome indicated that the concept of stress originated to describe responses to physical demands. Thus, following Schuler (1980), we suggest that physical variables can be both objective and subjective occupational stressors.

The present study explored the extent to which certain characteristics of work stations are occupational stressors. Following Sutton and Kahn's (1987) application of an engineering analogy, we defined a stressor as a perceived or objective external force, such as a demand, pressure, constraint, or deprivation, that brings about such strains as dissatisfaction, performance decrements, and somatic symptoms. Laboratory research, especially research on human factors, has indicated that physical variables can bring about negative reactions. But it is unclear if the physical variables encountered in workplaces are of sufficient magnitude or sufficiently powerful in comparison to other variables to have negative effects on employees' reactions. In order to contribute to the literature concerning job stress, we sought to determine if there is a relationship between a set of stimuli, the characteristics of work stations, and negative psychological, physiological, and behavioral reactions. Specifically, we studied two categories of possible physical stressors: intrusions from atmospheric conditions and intrusions from other employees.

REVIEW OF LITERATURE AND PREDICTIONS

Intrusions from Atmospheric Conditions

Laboratory studies have documented the adverse effects of extreme atmospheric conditions. Research in ergonomics has demonstrated the negative effects of hotness and coldness, with several studies linking extreme variations in temperature to decrements in performance (Ellis, 1982; Meese, Lewis, Wyon, & Kok, 1984; Wexley & Yukl, 1984) and others linking such variations to subjective fatigue and moods (Nelson, Nillson, & Johnson, 1984). Griffitt (1970) documented social-psychological effects of uncomfortable temperatures, reporting that interpersonal attraction was lower among subjects exposed to high temperatures than among subjects exposed to moderate temperatures.

The ergonomics literature also suggests—contrary to the results of the Hawthorne studies—that inappropriate lighting is a source of distress (Knave, 1984). It is difficult to make specific statements about levels of lighting since their appropriateness depends heavily on the nature of a task (Bennett, Chitlangia, & Pangreka, 1977; Hayward, 1974; Wexley & Yukl, 1984). But there is agreement among scholars that high levels of glare, lack of natural light, and levels of lighting that are too low for a given task can have negative effects on performance and well-being, thus acting as stressors. Along similar lines, Oldham and Rotchford (1983) found a negative relationship between darkness and employees' reactions, including satisfaction with work, the presence of personal items in the work station, and discretionary time

spent in the work station. Thus, although there is limited evidence from organizational settings, related research has suggested that intrusions from atmospheric conditions are occupational stressors. Our first prediction was, therefore, that unfavorable atmospheric conditions like hotness, coldness, and poor quality lighting would be associated with negative reactions by employees.

Intrusions from Others

Physical attributes of work stations also structure and constrain interpersonal interactions (Davis, 1984; Pfeffer, 1982). Some physical settings can encourage intrusions from others that may be stressors. A diverse body of research supports this perspective. Studies in social psychology have confirmed that people have negative reactions to crowding and density (Langer & Seagert, 1977; Schmidt & Keating, 1979). Similarly, Oldham and Rotchford (1983) found that the density of a work space was negatively related to perceptions of concentration and privacy. Oldham and Brass (1979) reported that changing to an open office plan—which led to an increase in intrusions from others—had negative effects on employees' satisfaction and motivation. In addition, research on human factors has indicated that excessive and unpredictable noise, common in crowded settings, hampers performance and causes emotional strain (Corso & Moomaw, 1982; Gawron, 1984).

Diverse studies have suggested that close and uncontrolled proximity to others can be a stressor. Thus, our second prediction was that employees would have negative reactions to work environments characterized by noise and distractions, lack of control over privacy, and high population density.

A plausible rival hypothesis is that settings in which people encounter frequent interruptions, have no doors to close, and are in close proximity to others may promote positive reactions among employees because they facilitate communication and development of strong interpersonal bonds. Oldham and Brass's summary of the social relations approach to office design suggested such a view: "The social relations approach argues that the absence of interior walls and barriers in open-plan offices facilitates the development of social relationships among employees, which, in turn, positively influences employee motivation and satisfaction" (1979: 267–268).

Research on open offices has produced some evidence for the positive effects of easy access to co-workers. Zalesny and Farace (1987) found, for example, that perceived task identity increased for clerical, professional, and managerial employees after the change from a traditional to an open-design office. In addition, clerical workers in that study reported greater privacy after the design change.

The weight of the evidence on the effects of open offices on employees' reactions suggests, however, that interruptions, distractions, noise, and lack of privacy undermine the potential positive effects of increased communication (Becker, 1981; Oldham & Brass, 1979). To illustrate, despite the positive effects mentioned above, the study by Zalesny and Farace (1987) revealed that the change to an open office had generally negative effects, including

declines in feedback, trust in administration, job satisfaction, and information requests initiated. Moreover, in contrast to clerical workers, managers and professionals reported less personal privacy after the design change. This pattern of results reinforces our expectation that noise and distractions, lack of control over privacy, and high density are stressors and will thus be associated with negative reactions among employees.

Reactions to Work Station Versus Reactions to Work

We have argued that atmospheric conditions and intrusions from others can be occupational stressors. Extensive research has documented the negative effects that occupational stressors have on affective, behavioral, and physiological reactions (Caplan, Cobb, French, Harrison, & Pinneau, 1980; Cooper & Payne, 1978; Katz & Kahn, 1978; Schuler & Sethi, 1984). Previous research on occupational stress, however, has not explicitly considered work stations as a source of stressors. Thus, it is unclear to what extent these potential stressors will bring about the affective, behavioral, and physiological reactions evoked by other occupational stressors. Perhaps characteristics of work stations are not sufficiently potent to influence people's general reactions to their jobs. Considering the specific and focused nature of these potential stressors, they may primarily affect employees' reactions to work stations themselves. Oldham and Rotchford's (1983) finding that an office's characteristics have a stronger relationship with reactions to the office than with general reactions to the work suggest such a pattern.

In order to explore that question, the present study distinguished between two categories of employees' reactions: satisfaction with work station and general reactions to work. Following Katz and Kahn (1978), in the second category we included affective, physiological, and behavioral components. As was discussed, previous research has documented generally negative reactions among people exposed to poor atmospheric conditions and to intrusions from others. Our third prediction was, however, that work stations' characteristics would be more strongly related to employees' reactions to work stations than to their general reactions to their work.

The Moderating Effect of Role Overload

Finally, several variables may condition relationships between work stations' characteristics and employees' reactions. We explored the moderating effects of role overload; our review of the literature revealed no previous such exploration. Exploring the conditioning effects of role overload seemed promising because a pair of competing hypotheses we developed for the study—detachment and aggravation—make very different predictions for that variable.

The detachment hypothesis suggests that, compared to other employees, overloaded employees will concentrate harder on doing their jobs and thus be bothered less by intrusions from the physical environment. Human beings have limited information processing capacity (March & Simon, 1958). Thus, busy employees are less likely to notice or cognitively process attributes of

their working environment. They are less likely to have time to pay attention to noise, heat, and poor lighting; therefore, such stressors are less likely to influence them. The detachment hypothesis predicts that the relationship between intrusions and negative reactions will be weak among employees who report high role overload.

In contrast, the aggravation hypothesis suggests that intrusions may be especially upsetting to overloaded employees. Intrusions from others may not be troublesome to employees with little to do; they may even welcome the entertainment provided by frequent interaction with others. But noise and interruptions, density, and lack of control over privacy may be especially upsetting to overloaded employees because such intrusions waste time and interfere with concentration. Similarly, excessive heat, excessive cold, and poor lighting may be more potent stressors for overloaded employees because they hamper their ability to do their work. For example, previous research has shown that excessive heat interferes with concentration and increases errors (Fine & Kobrick, 1978; Wing, 1965). Thus, our aggravation hypothesis predicts that the relationship between stressors in a work station and negative reactions will be stronger among employees who report high role overload.

METHODS

Sample and Procedures

Respondents were 109 clerical employees at the University of Michigan who were selected via snowball sampling (Babbie, 1981): each person interviewed was asked to nominate other university employees who might be eligible to participate in the research. Respondents were asked not to discuss the study with their peers. Members of the research team¹ did not attempt to interview every nominated employee because of efforts to introduce variation in office design into the sample. Of the respondents interviewed, 48 percent worked in conventional offices, 19 percent in open-plan offices with partitions, and 33 percent in open-plan offices without partitions. The response rate to the initial solicitation was 80 percent. Data were collected from (1) a structured interview conducted with individual respondents at their work stations, (2) a structured observation form completed by the interviewers to assess objective characteristics of each work station, and (3) a self-administered questionnaire completed by respondents.

Measures

Characteristics of work stations. Three measures of intrusions from atmospheric conditions and three measures of intrusions from other employees were used in this study. Hotness, coldness, and poor quality lighting were the three indicators in the first category. We measured hotness as the product of an employee's judgment as to how often it got too hot at a work station and the temperature at the work station when it is at its hottest.

¹ These data were collected by Robert P. Quinn, Pamela O'Connor, and students of their Survey Research Methods course.

Similarly, coldness was a product of judgments concerning how often it got too cold and the temperature at the work station at its coldest. We used multiplicative rather than additive scales because we considered extreme temperatures to be occupational stressors only to the extent that employees encountered them frequently. The Appendix presents complete items and response sets for these and all other measures and identifies the methods of data collection that provided information on each item.

Building on Hayward's (1974) work, we viewed the quality of light as a function of the presence of natural light, the degree of control over that lighting, and the adequacy of electrical lighting. We assigned a 1 for each of the following indicators of good lighting: control over the amount of overhead lighting, direct natural light from windows, indirect natural light from windows, the presence of one or more movable lights, the presence of direct overhead lighting fixtures, and the presence of incandescent lighting. We then summed these six indicators to calculate the total light score. This score was reversed in order to create an index of poor quality lighting as a potential stressor.

In the second category, intrusions from others, the three measures concerned noise and distractions, density, and control over privacy. We based the noise and distractions scale on 4-item self-report measure developed by Marans and Spreckelmeyer (1981) ($\alpha = .59$). Density was the ratio of the number of people in the room to its size in square feet. Respondents reported numbers of people, and the interviewers used a tape to measure rooms. This measure was also derived from Marans and Spreckelmeyer.

Control over privacy was an objective measure of employees' abilities to shut off their work stations from intrusions by others. The highest level of control occurred when an employee—and only that employee—could close one or more doors; the lowest level of control occurred when an employee could not shut off a work station.

Employees' reactions. The study used one measure of satisfaction with work station and three measures of general reactions to work. We again employed a measure developed by Marans and Spreckelmeyer (1981) with 19 items addressing satisfaction with various aspects of work stations, including size, amount of storage space, visual privacy, noise level, and freedom from distractions ($\alpha = .88$).

Somatic complaints, job satisfaction, and change in jobs were the three general reactions to work assessed. We based the somatic complaints scale on measures developed by Quinn and Staines (1979). Respondents indicated if they experienced any of nine symptoms like eye irritation, headaches, tenseness, and faintness. A score of 0 indicated no complaints; a 9 indicated that all the symptoms were reported.

Job satisfaction was assessed with a 5-item scale that drew heavily on a facet-free job satisfaction measure developed by Quinn and Staines (1979) that has been used in three rigorous studies of quality of employment in a random sample of American workers and was validated by Mangione (1973).

Another study (Caplan et al., 1980) showed it to be an indicator of employees' reactions to stress ($\alpha = .89$).

We gathered data on job changes through follow-up phone calls two years after initial data collection. Respondents received 1 if they were still on a job and 2 if they had left. Leaving a job meant that either the respondent had left the university for another employer, or had taken another position in the university that entailed working in a different department, for a different supervisor, and doing so in a different work station. Almost half of the respondents (47%) had changed positions; we did not distinguish between voluntary and involuntary changes.

Moderator variable. The measure of perceived role overload was based on an overload scale developed by Quinn, Seashore, Kahn, Mangione, Campbell, Staines, and McCullough (1971); its four items concern the amount of work expected of employees and the extent to which they perceive completing this work as difficult ($\alpha = .73$).

RESULTS

Table 1 reports means, standard deviations, and intercorrelations for all variables.

We used multiple regression analysis to test the four predictions. The use of separate regression equations for each dependent variable was appropriate because, even though relationships were observed among the four dependent variables, the magnitudes of such intercorrelations were generally small. We computed two sets of equations to test the direct effects of work stations' characteristics on employees' reactions. Table 2 reports the results of these analyses.

The results of the first set of four regressions, in which the three potential atmospheric stressors served as independent variables, provide limited support for the first prediction. As can be seen in Table 2, intrusions from atmospheric conditions were significantly related only to satisfaction with work station. Hotness, coldness, and poor quality lighting were significantly and negatively related to that dependent variable. Coldness was also significantly related to somatic complaints, but because overall R^2 for this equation was not significant we did not accept this result as significant (Cohen & Cohen, 1975).

The results of the second set of regression equations, in which stressors emanating from other people served as independent variables, provide somewhat stronger support for the second prediction. As summarized in Table 2, intrusions from others were significantly related to satisfaction with work station. Specifically, the intrusion of noise and distractions was a significant predictor of that variable. Further, two types of intrusion from others—density and control over privacy—were significant predictors of job satisfaction. The variable for noise and distractions was also significantly related to change in jobs, but that result should not be accepted as significant since the overall equation was not statistically significant.

TABLE 1
Means, Standard Deviations, and Intercorrelations Among All Variables^a

Variables	Means	Standard Deviations	1	2	3	4	5	6	7	8	9	10
1. Noise and distractions	2.57	0.56										
2. Density	0.03	0.08	-.00									
3. Control over privacy	1.72	1.24	-.15	-.05								
4. Hotness	6.47	4.29	.18	-.04	-.07							
5. Coldness	6.52	3.82	.04	-.10	-.11	-.14						
6. Poor quality lighting	3.49	0.96	-.15	.13	.08	-.10	.04					
7. Satisfaction with work station	2.82	0.55	-.38	.03	.06	-.20	-.19	-.21				
8. Job satisfaction	3.26	2.76	.03	-.10	-.07	.06	-.16	-.04	.13			
9. Somatic complaints	3.84	1.01	.28	.04	-.07	-.03	.23	-.01	-.15	-.43		
10. Change in jobs	1.47	0.52	.16	-.07	-.02	-.05	.11	-.06	-.05	-.16	.24	
11. Role overload	3.76	0.92	.11	.08	-.13	.03	.05	-.03	.11	-.21	.05	.11

^a N = 109.

TABLE 2
Characteristics of Work Stations as Predictors of Employees' Reactions^a

Work Stations' Characteristics	Satisfaction with Work Station	Job Satisfaction	Somatic Complaints	Change in Jobs
Intrusions from atmospheric conditions				
Hotness	-0.03**	0.01	0.05	-0.01
Coldness	-0.03**	-0.04	0.13*	-0.01
Poor quality lighting	-0.11**	-0.03	-0.04	0.04
Overall R ²	0.14***	0.03	0.03	0.02
Intrusions from others				
Noise and distractions	-0.37***	0.14	0.58	0.19*
Density	-0.26	-1.81*	1.85	-0.52
Control over privacy	0.00	-0.31*	-0.66	0.08
Overall R ²	0.13**	0.07*	0.03	0.05

^a Entries are unstandardized regression weights. Values for R² were obtained in two sets of regression analyses with each category of characteristics predicting reactions.

* $p < .10$

** $p < .05$

*** $p < .01$

The third expectation was that characteristics of work stations would be more strongly related to satisfaction with a work station than to general reactions to a job. This expectation was consistent with the results of the regression analyses and with the observed correlation coefficients. Both multiple regressions predicting satisfaction with work station were significant. In contrast, only one of the six multiple regressions predicting general reactions to a job was significant. This regression was also of the lowest magnitude and lowest significance ($R^2 = .07$ versus .14 and .13).

In order to provide further evidence about the third hypothesis, we computed the mean of the correlations between characteristics of work stations and employees' reactions using Fisher's Z' transformation, which Cohen and Cohen (1975) recommended for dealing with correlational values as variables. The mean correlation between work stations' characteristics and satisfaction with work station was $r = .19$; in contrast, the mean correlation between those characteristics and general reactions to a job was $r = .09$. For our respondents, the mean correlation of .19 is significantly different from 0 ($p < .05$), but a correlation of .09 is not significantly different from 0. Thus, it is reasonable to conclude that a nonrandom relationship exists only between characteristics of work stations and satisfaction with work station.

The moderating effect of role overload was tested using moderated regression analysis (House, 1981; Zedeck, 1971). We judged moderated regression to be a more appropriate test of the relationship than subgroup analysis because role overload is a continuous rather than a categorical variable (Peters & Champoux, 1979; Zedeck). We calculated 24 separate regression equations.

Each included a work station characteristic, role overload, and their product as predictors, and an employee reaction as a dependent variable. The generic model for each of these regression analyses was:

$$y = b_1 (x_1) + b_2 (x_2) + b_3 (x_1 \times x_2),$$

where x_1 = a characteristic of the work station, x_2 = role overload, and y = an employee's reaction.

Table 3 summarizes these analyses, reporting the regression coefficients associated with the interaction terms. We observed significant interactions for density and hotness. The product of density and overload was significantly related to satisfaction with both job and work station. The increments in R^2 associated with those interactions were .18 and .10, leading to final values for R^2 of .18 and .12. These findings were consistent with the detachment hypothesis. In other words, among people reporting high role overload, we observed weaker relationships between (1) density and dissatisfaction with their work stations, and (2) density and dissatisfaction with their jobs than prevailed among those who did not report high overload.

The findings for hotness were also consistent with the detachment hypothesis. With an increase in both hotness and role overload there tended to be a decrease in reported somatic complaints and an increase in job satisfaction. The increments in R^2 associated with these interactions were .05 and .08, leading to final values for R^2 of .05 and .08. In sum, when moderating effects of role overload emerged, they supported the detachment hypothesis rather than the aggravation hypothesis.

TABLE 3
Moderating Effects of Role Overload on the Relationship Between Work Stations' Characteristics and Employees' Reactions^a

Work Stations' Characteristics	Satisfaction with Work Station	Job Satisfaction	Somatic Complaints	Change in Jobs
Intrusions from atmospheric conditions				
Hotness	0.02	0.07***	-0.13*	-0.00
Coldness	-0.01	-0.03	-0.02	-0.01
Poor quality lighting	-0.02	-0.10	-0.29	0.03
Intrusions from others				
Noise and distractions	0.05	-0.07	-0.04	-0.02
Density	3.57***	4.05**	-3.75	0.86
Control over privacy	0.00	0.01	-0.03	-0.02

^a Entries are the unstandardized regression coefficients associated with the interaction term between role overload and each characteristic. See text for a more detailed explanation.

* $p < .10$

** $p < .05$

*** $p < .01$

DISCUSSION

The results of this research suggest that—at least for clerical employees—characteristics of work stations may not be occupational stressors. We obtained weak support for our first prediction, an association between intrusions from atmospheric conditions and negative reactions among employees. Somewhat stronger support emerged for our second prediction, that intrusions from others would be related to negative reactions among employees.

The evidence was consistent with our third prediction, that work stations' characteristics would be more strongly related to specific reactions to a work station than to general reactions to work. Two of the three significant multiple regression equations concerned relationships between those characteristics and satisfaction with a work station.

Unlike other potential sources of occupational stress examined in prior research, intrusions from atmospheric conditions and from others appear for the most part to be unassociated with general negative reactions to work roles. One interpretation of these findings is that researchers investigating job stress should not devote resources to the study of characteristics of work stations, for why bother to study such weak predictors? That recommendation may, however, be premature. Findings from this research do indicate that clerical workers were less likely to be satisfied with their work stations and jobs when they faced intrusions from others. Those findings reinforce evidence that open offices have generally negative effects on employees' reactions (Becker, 1981; Oldham & Brass, 1979; Zalesny & Farace, 1987). Managers considering a move to an open office—or other changes that would increase such intrusions—should consider that evidence.

Intrusions from others may be stressors because they hamper control and decrease predictability of important events. Interruptions from noisy co-workers, noisy machines, ringing telephones, and people walking in and around a work station may be impossible to predict and may thus lead employees to perceive that they have little cognitive control (Langer & Saegert, 1977) over important events. Similarly, employees who cannot shut off their work stations from others do not have the opportunity to regulate unwanted and unpredictable interruptions. Density may also increase unpredictable interruptions and decrease perceived control. Langer and Saegert suggested that crowding, a feature of offices with high density, has an independent and negative effect on cognitive control. Previous research has suggested that lack of control and lack of predictability are potent stressors (Seligman, 1975; Sutton & Kahn, 1987). Thus, perceptions of control and predictability may mediate the relationship between intrusions from others and negative reactions. We could not test that hypothesis in the present study because we did not measure perceptions of control and predictability, but future research could examine it.

Interruptions—rarely studied by researchers concerned with job stress—thus may be potent sources of unpredictability and lack of control. Our subjective measure of noise and distractions and objective measures of control over privacy and density provided indirect evidence of interruptions. A

better strategy may be to measure interruptions directly. The methods used by Mintzberg (1973) to assess managerial activity could be used in concert with objective measurements of strain like levels of serum cholesterol, heart rate, and blood pressure and with such subjective measurements as dissatisfaction, somatic complaints, and anxiety.

Despite the findings of this study of clerical workers, subsequent research may uncover situations in which interruptions enhance well-being. Mintzberg (1973) found that managers typically seek the live action created by interruptions such as phone calls and unexpected visitors. Interruptions can produce task variety and create opportunities for friendship—variables that are associated with positive outcomes (Hackman & Oldham, 1980; Sims, Szilagyi, & Keller, 1976).

The results of this research also suggest that atmospheric conditions may have some negative effects. Secretaries and administrative assistants reported dissatisfaction with work stations that they perceived as too hot or too cold, and that had poor quality lighting. Although we observed a significant correlation between perceived coldness and somatic complaints ($r = .23$, $p < .05$), the results of multiple regression analysis did not confirm this relationship. The ranges of temperature and lighting that occur in offices may not be extreme enough to bring about negative reactions. An alternative explanation is that measurement error occurred because our measures did not directly assess lighting and temperature. Future research could use a light meter to measure illumination in the number of footcandles, as human factors engineers do (IES Nomenclature Committee, 1979). Thermometers could be used to measure hotness and coldness with more precision.

Perceptual effects that we did not consider may accompany the main effects of intrusions from atmospheric conditions and intrusions from others. In particular, future research might consider "frog pond" effects (Firebaugh, 1980), or effects attributable to reference groups, and the possibility that the amount of intrusion experienced in comparison to similar others is a better measure than the absolute level of perceived intrusion. Thus, having an office with no door may only be a stressor if co-workers have private offices.

Finally, results of this study suggest that role overload may be a promising moderator variable. We detected moderating effects of role overload in only 4 of the 24 multiple regression equations; thus, it is arguable that those analyses most strongly support the null hypothesis. The proportion of significant findings is greater, however, than the proportion attributable to chance, and the significant findings offer consistent support for the detachment hypothesis rather than the aggravation hypothesis. However, additional evidence is needed from larger populations and from populations representing a wider range of occupations to confirm either the null, detachment, or aggravation hypothesis.

The potential implications of the detachment hypothesis are intriguing. An optimistic interpretation is that "busier hands are happier hands." But Machiavellian managers may make an unfortunate inference: employees might stop complaining about hot and crowded working conditions if they are

given more work. We believe such a strategy is likely to backfire in the long run because of the negative effects of role overload (Katz & Kahn, 1978).

Finally, the detachment hypothesis has an important theoretical implication. Role overload may overwhelm the information processing capabilities of employees so that they do not notice—or at least do not react to—intrusions from atmospheric conditions and from others. The limited support for this hypothesis demonstrated in this study also suggests a more general lesson for theorists concerned with job stress. Perhaps people perceive occupational stressors hierarchically; if they are under relatively severe stress they may not notice or react to relatively minor threats. Other severe stressors that are unrelated to role overload, such as job insecurity and role ambiguity, may concern employees to such an extent that they do not notice or react to relatively minor stresses. But people who do not face severe stressors may be affected by variables like characteristics of work stations because they have the psychological and physical ability to notice and react to relatively minor threats to their well-being.

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APPENDIX

Measures are based on data collected in one of three ways: a structured interview, structured observation by the interviewer, and a self-administered questionnaire completed by the interviewee.

Noise and distractions. All items used a 4-point response format with 1 = never and 4 = often; data were collected via the structured interview.

When you are trying to work alone and concentrate on something, how often are you interrupted or disturbed by:

- a. Other people's conversations?
- b. Typewriters or other office machines?
- c. Telephone ringing?
- d. People moving about or walking through the area?

Density. The index was the quotient of item a divided by item b.

- a. How many other people work in the room where you work? (Interview)
- b. Number of square feet in the room. (Observation)

Control over privacy. The interviewer rated the question "How can the respondent shut her or his work station off from co-workers in the immediate area?" on the structured observation form using the following scale:

- a. Workplace cannot be shutoff by any shutting of doors.
- b. Workplace can be shutoff by closing one or more doors that are not under respondent's control.
- c. Both b above and d below are necessary to close off the work station.
- d. Work station can be shutoff by closing one or more doors that are under respondent's control.

Hotness. Both items were part of the structured interview.

- a. About what is the temperature at your work station when it's at its hottest?
- b. How often does it get too hot for you at your work station? (4-point response format: never–often)

Coldness. Both items were part of the structured interview.

- a. About what is the temperature at your work station when it's at its coldest?
- b. How often does it get too cold for you at your work station? (4-point response format: never–often)

Poor quality of light. All items used a 2-point scale with 1 = no and 2 = yes. Items a–c came from the structured interview and items d–f from structured observation.

- a. Do you have any control over the amount of overhead lighting there is over your work station?
- b. Does any light from a window fall directly on any office machines or work surface you use?
- c. Does your work station get any indirect light from a window?
- d. Is there an overhead lighting fixture directly over respondent's work station?
- e. Does the room where respondent works have incandescent lighting?
- f. Are there any desk lamps, floor lamps, or lamps suspended from furniture at respondent's work station?

Satisfaction with work station. All items called for responses on a 4-point format with 1 = not at all and 4 = very and were part of the self-administered questionnaire.

How satisfied are you with each of the following aspects of your work station?

- a. The amount of space I have.
- b. The color scheme.
- c. My view outside.
- d. The location of my immediate supervisor's office in relation to my own.
- e. The access I have to my co-workers.
- f. The amount of space I have for storage.
- g. The location of the space I have for storage.
- h. The amount of work surface I have.
- i. How comfortable my chair is.
- j. The amount of liberty I have to personalize my work station.
- k. The lighting.
- l. The freedom from distractions I have.
- m. The amount of conversational privacy I have.
- n. The amount of visual privacy I have.
- o. The noise level.
- p. The temperature.
- q. The air quality.
- r. The floor covering.
- s. The frequency with which my work station is cleaned.

Somatic complaints. All items called for 1 = no or 2 = yes and were part of the structured interview.

When using your typewriter or electronic word processor, do you experience any:

- a. Eye irritation or strain?
- b. Headaches?
- c. Dizziness or nausea?
- d. Tenseness or nervousness?
- e. Backaches or back pains?
- f. Stiff neck?
- g. Numbness or cramps in wrists or arms?
- h. Foot or leg problems?
- i. Feeling faint or having fainting spells?

Job satisfaction. Items a and b were part of the structured interview; items c–e were on the self-administered questionnaire and called for responses on a 6-point format ranging from strongly agree to strongly disagree.

a. All in all, how satisfied would you say you are in your job? (4-point response format: 1 = not at all, 4 = very)

b. If you were free to go into any type of job you wanted, what would your choice be? (Retire or take another job; keep current job.)

c. I find real enjoyment in my job.

d. I am disappointed that I ever took this job. (Reverse-scored)

e. I feel that I am happier in my job than most other people in my unit.

Role overload. All items called for responses on a 6-point format ranging from strongly agree to strongly disagree and were on the self-administered questionnaire.

a. My job requires that I work very fast.

b. My job requires that I work very hard.

c. I never seem to have enough time to get everything done on my job.

d. I have too much to do everything well.

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THE ROLE OF RISK IN EXPLAINING DIFFERENCES IN PROFITABILITY

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This study examined the role of risk in explaining cross-sectional differences in the profitability of business units. Applying suggestions of financial theory, we disaggregated risk into two components—systematic and unsystematic—that are thought to have different effects on return. Drawing on the PIMS data base, we found each component of risk to have a substantial, significant, and different impact on return on investment (ROI). The research and strategy implications of the roles of risk are discussed.

The two key factors in any investment decision are return and risk. Under the assumption that investors are risk-averse and seek to minimize the risk for any level of expected return, intuition suggests that additional return must compensate investors for assuming additional risk. Scholars in finance and other disciplines have devoted a great deal of work to refining and formalizing this intuition.

This same logic applies in the context of strategy, as Wensley (1981), Bettis and Mahajan (1985), and others have observed. A strategic investment decision should explicitly consider risk—decision makers should demand a higher return for an investment involving high risk. Yet, in typical practice, strategic investment decisions are adjusted for risk ad hoc, if at all. Firms typically set relatively high hurdle rates in making go/no go investment decisions and apply these rates to all investments, regardless of their riskiness (Hayes & Gavin, 1982). Further, historical evaluation of existing strategies, whether it concerns evaluating present management or attempting to place values on businesses to be divested or acquired, focuses almost exclusively on return and rarely attempts to quantify risk.

These failures to account for risk adequately will unquestionably lead to inappropriate decisions. All else being equal, if firms judge business performance only in terms of return, regardless of risk, they will place more resources than warranted in risky strategies, forgo profitable opportunities, and apply misguided performance evaluations. Further, if researchers do not control for risk in studies assessing the effects of strategic factors on

We would like to thank the Strategic Planning Institute for providing access to the data used in this study.

profitability, they will obtain biased estimates of the effects on return of those strategic factors correlated with risk.

Although a number of data bases have been specifically constructed to analyze the determinants of the profitability of business units, empirical work investigating differences in profitability has all but ignored the possible role of risk. The numerous studies that use the Profit Impact of Market Strategies (PIMS) data base of the Strategic Planning Institute have focused on factors such as market share, product quality, and marketing efforts as determinants of profitability, to the exclusion of risk (Branch, 1980; Schoeffler, Buzzell, & Heany, 1974). Similarly, the many studies using the Line of Business data base of the Federal Trade Commission have neglected risk, focusing instead on market structure variables (Ravenscraft, 1983; Schmalensee, 1985). Both sets of studies implicitly assume that risk is not an important determinant of profitability or that strategic and public policy decision making can largely ignore it.

The few empirical studies that have looked at the association between return and risk in firms, as measured by standard deviation or variance in accounting ROI, have produced inconsistent conclusions. Cardozo and Smith (1983) found a positive correlation of .67 between annual ROI and the standard deviation in accounting ROI. Fisher and Hall (1969) also found a positive and significant, though small, association. Others (Bettis & Mahajan, 1985; Stigler, 1963) found no statistically significant association. Shepherd (1972) reported a negative, though insignificant, association, and Bowman (1980) found a significant negative association between risk and return.

A major limitation in all these studies is their use of variation in ROI as the measure of risk, a practice that ignores financial theory. The Capital Asset Pricing Model (CAPM) (Lintner, 1965; Sharpe, 1964) separates risk into two components: (1) systematic risk, that part of variation in return caused by economy-wide disturbances affecting all investments, and (2) unsystematic risk, variation in return not associated with economy-wide conditions. According to the CAPM, these two different types of risk have different effects on return, and investors receive compensation only for systematic risk because they can eliminate unsystematic risk simply by holding diversified portfolios.

Many research efforts assessing the influence of risk on return have based their analyses on the CAPM financial theory, but they have not made this fundamental and crucial distinction between systematic and unsystematic risk. By using a measure of total risk, investigators are likely to misinterpret both empirically and conceptually the role of risk in influencing return.

This study attempted to assess the importance of risk in explaining differences in profitability between strategic business units. We partitioned risk into the two components hypothesized by the CAPM to have different effects on return. Using the PIMS data base, we found systematic and unsystematic risk to have substantial, significant, and different effects on the profitability of firms.

SYSTEMATIC VERSUS UNSYSTEMATIC RISK

The Capital Asset Pricing Model

The CAPM postulates that only systematic risk, that variation in an investment's return associated with the economy-wide or market return,¹ is relevant. This model depicts the expected return on an investment as equal to the rate of return on a risk-free asset plus a factor, beta, reflecting the systematic risk of the investment, times the expected value of the difference between the market-return and the risk-free return:

$$E(R_{jt}) = R_{ft} + \beta_j \times E(R_{mt} - R_{ft}) , \quad (1)$$

where R_{jt} = return on asset j at time t , R_{ft} = return on a risk-free asset at time t , R_{mt} = return on a market portfolio at time t , and β_j = a factor reflecting the association of the return on asset j with the market return.

Hundreds of studies using stock market data have assessed the validity of the CAPM by testing its implications. Two primary implications of the model are that (1) a positive linear relationship exists between return and systematic risk, as measured by beta, with a slope equal to average risk premium and a zero intercept, and (2) no association exists between return and unsystematic risk. The consensus from these studies is that the CAPM adequately, although imperfectly, describes the association between risk and return.²

Unsystematic Risk in a Strategic Context

The CAPM's logic directly applies to the evaluation of a business or project (Van Horne, 1980). The appropriate discount rate to use in discounted present-value analysis depends on a project's systematic risk (beta) and is independent of its unsystematic risk. When differences in profitability are evaluated, businesses with high betas will need to compensate for additional risk by showing higher average rates of return, as indicated by Equation 1, than businesses with low betas.

The CAPM implies that unsystematic risk should not influence managers' decisions. However, some of this theory's assumptions and conditions, although perhaps valid in the context of the stock market, may be inappropriate in a strategic context. It is useful to examine these assumptions and rationales as to why unsystematic risk should not influence strategic decisions.

One assumption that may be inappropriate to strategy is that investors are price takers (Devinney, Stewart, & Shocker, 1985) who can invest as much or as little as they like and receive comparable returns. However, there are usually strategically optimal levels of investment, and using portfolio

¹The market return is conceptually the return on all investments, but is typically represented in empirical research by the Standard and Poor's Index of common stocks.

²For a different view, see Roll (1977).

diversification as the criterion for setting a level of investment is usually not feasible.

Another assumption of the CAPM is that insolvency or bankruptcy cost nothing and that a business can sell its assets at their economic value. However, if an SBU fails, it may have to sell assets at distress prices far below their market value because of legal fees, expensive delays, costly service obligations, or a premature collapse of sales. Thus, investors may need additional return to compensate for costs associated with business failure if they are to assume unsystematic risk.

One of modern financial theory's most important implications for managers—who are assumed to act as agents for shareholders—is that diversification, or the reduction of unsystematic risk, should not in itself be a goal of management. It is easier and less costly for an investor to diversify by buying a portfolio of stocks than for a firm to diversify by buying a portfolio of companies. Diversification strategies undertaken by management only benefit investors to the extent that these strategies have synergistic value.

However, there are incentives for managers to reduce unsystematic risk by diversification or other strategic choices. Bonuses, and perhaps even job security, may depend on avoiding some consequences of unsystematic risk. It is reasonable to assume that managers are risk-averse individuals who invest significant human capital in specific businesses; thus, they are concerned about the total variability in the value of their SBUs, including that portion of variance that investors of capital can eliminate by holding diversified portfolios of investments.

Some talented managers may avoid firms where unsystematic risk, and thereby career risk, is high. To the extent that reduction of unsystematic risk may increase the quality of management, it may be an appropriate consideration for investors.

It might be argued that managers receive incentives, such as golden parachutes, that eliminate some of the adverse consequences of unsystematic risk and encourage them to act as agents for shareholders. However, such devices typically affect only a few very top executives, and in many cases managers have deemed them inadequate compensation. In addition, the recent high level of merger and antimerger activity suggests that managers have not put agency theory completely into practice. A second option, which 3M and some other firms employ as a matter of policy, is to tolerate failure associated with unsystematic risk by guaranteeing that the failure of an enterprise need not adversely affect careers. The most common policy, however, places the burden of unsystematic risk on managers. Thus, they should be expected to consider unsystematic risk important and may take actions that create an association between unsystematic risk and return.

Hackett (1985) commented that it is unrealistic to assume that managers are merely agents for shareholders. Instead, managers attempt to reconcile the interests of all stakeholders—labor, suppliers, customers, and communities in which their businesses operate, including those furnishing economic resources. Like managers, these stakeholders have limited ability to compen-

sate for unsystematic risk through diversification, and protecting them provides an additional incentive for managers to avoid consequences of unsystematic risk. Doing so is likely to create a positive association between unsystematic risk and return.

MODELING THE ROLE OF RISK IN STRATEGIC CONTEXTS

The notion of risk aversion implies that a positive association will exist between risk and return. According to the CAPM, the different elements of risk—systematic and unsystematic—have different influences on return, and only systematic risk influences return on stocks. However, in the context of strategic decision making, it is consistent with this model to expect unsystematic risk to also affect return. These considerations give rise to two central null hypotheses concerning the effects of risk on the profitability of businesses:

Hypothesis 1: Systematic risk does not influence return.

Hypothesis 2: Unsystematic risk does not influence return.

Designers of models of SBUs' profitability that do not incorporate measures of risk assume implicitly that both of these hypotheses are appropriate. Strict adherence to the CAPM requires rejection of Hypothesis 1 and acceptance of Hypothesis 2. Advocates of models with measures of total risk assume that both hypotheses can be rejected and that the effects of systematic and unsystematic risk on return do not differ. Our discussion of risk in strategic contexts also suggests that both hypotheses can be rejected. However, we expect systematic risk to have the greater impact on return, because firms can to some extent eliminate the effects of unsystematic risk through diversification and various compensations for managers.

The literature has paid increased attention to the applicability—or lack of applicability—of financial theory to strategy (Bettis, 1983), but no one appears to have tested the analysis we propose in a strategic context at either a corporate or SBU level. Certainly, a great many conceptual and empirical problems exist in applying financial theory to SBUs. However, the payoff of modeling the role of different types of risk in influencing return is high. Such modeling can provide insights and guidance to managers and strategic theorists who would like to introduce risk into the assessment of business performance more formally. Further, to the extent that risk is important in explaining return, including it in profitability models reduces the likelihood of omitted variable bias affecting the estimated effects of other variables thought to influence return.

METHODS

Source of Data

For a vast number of strategic decisions, analysis based on the aggregate of business units composing a corporation is highly inappropriate. Differences in such central factors as product offerings, competitive environments,

and managerial expertise make for a heterogeneity among business units within firms that more often than not mandates separate decision making and analysis for each SBU. The motivation behind both the PIMS data base of the Strategic Planning Institute and the Line of Business data base of the Federal Trade Commission was the realization that corporate data were too highly aggregated to offer the necessary basis for analysis of SBUs.

Of the two, the PIMS data base offers the better opportunity to look at the trade-offs between risk and return at the SBU level because it contains time series information for a longer period than the Line of Business data base covers.³ Reports of over 2,000 SBUs that are components of the more than 200 participating corporations are the basis of the PIMS data. The PIMS project defines an SBU as a business unit within a firm selling a distinct set of products to an identifiable set of customers in competition with a well-defined set of competitors (Strategic Planning Institute, 1980). Businesses use a standardized form to report information on their strategies and market environments, as well as items from annual balance sheets and income statements. Because the data are kept confidential and participants use the data base, they are motivated to be accurate and conscientious when supplying information. Established SBUs from large firms are overrepresented; very few small firms and new businesses participate in the project. All businesses in the PIMS data base having 5 to 13 annual data points were included in this study; after applying this criterion, 1,376 businesses remained for study.

Estimating the Systematic Risk of SBUs

Stock price data. In order to test risk's influence on return, we required an estimate of beta for each business. Estimates of beta based on stock price data, reflecting the variation between a stock's return and the return to the market as a whole, are widely available. However, corporations typically include many different business units and divisions, perhaps operating in drastically different environments. It would be extravagant to assume that firms have homogeneous risk and to use their stock price betas as estimates of risk for individual business units. Also, data on stock prices may not be pertinent in strategic decisions. The concept of efficient markets implies that stock prices will react only to unanticipated shocks, as prices will already reflect the influence of anticipated events. Conditions influencing firms' rates of return thus may not constantly influence stock return, although in the long run profitability and stock return should be associated.

One approach to obtaining an estimate of an SBU's beta that would reflect its systematic risk better than its firm's stock price does would be to average the stock price betas of firms engaged in a similar line of business. Another would be to simply make a judgment as to the business' correlation

³However, even the PIMS data base has a relatively short span of time series data for the calculation of beta estimates. It contains annual information on SBUs for all or parts of the period 1970-83. For our analysis, we estimated betas for firms having from 5 to 13 annual observations; stock return betas are typically estimated on the basis of data of greater frequency or from longer periods.

with the economy-wide return. Both methods can be criticized, especially in an empirical context, as having a large potential for error and subjectivity.

Accounting data. Alternatively, accounting data can provide an estimate of beta for an individual SBU. Using accounting ROI as the relevant measure of return, an accounting beta can be calculated by comparing a business unit's ROI with the economy-wide ROI. Although it seems the most objective and reliable option, this approach also has potentially serious problems.

Despite its widespread use in practice, scholars have extensively criticized ROI as being a totally inadequate indicator of rate of return (Fisher & McGowan, 1983; Harcourt, 1965; Solomon, 1971). ROI does not properly relate a stream of profits to the investment that produced it. Its earnings numerator is a consequence of investment decisions made in the past, but its assets denominator can be expected not only to have influenced past and current earnings, but also to influence future earnings. Because ROI provides an inaccurate mapping, critics have said it is so seriously flawed as to bear little, if any, resemblance to the underlying concept of internal or economic rate of return (Fisher & McGowan, 1983). This possible invalidity would adversely influence an empirical investigation of the association between risk and return that used accounting ROI both as a dependent variable and as the basis for estimating beta.

Two factors suggest that there might, however, be some validity in the use of accounting ROI to assess risk's role. First, using data from the University of Chicago's Center for Research in Security Prices and from Standard and Poor's COMPUSTAT® for 241 firms over the period 1963–82, Jacobson (1987) found a significant association between annual accounting ROI and a well-accepted measure of economic return, stock return. Although the relatively small correlation of .14 indicated that the market also uses much other information, it does seem to use information concerning profitability that ROI to some extent depicts. Surprisingly, given the conceptual problems with ROI as a measure, Jacobson could not reject the hypothesis that there is a unit correspondence between ROI and stock return.⁴ Cross-sectional analysis also yielded this association. Thus, ROI does contain information that is associated with differences in profitability between firms. Second, a number of studies have found a correlation between stock price beta and accounting beta (Beaver & Manegold, 1975). Although the extent of the association seems to depend on the accounting measure used as an indicator of return and the time period under study (Hill & Stone, 1980), almost all studies have tended to find a positive association.

The fact that associations seem to exist between ROI and stock return and between accounting and stock price beta suggested to us that by using accounting data we might obtain insights into the trade-off between risk and return at the SBU level. However, several empirical considerations made it

⁴The hypothesis of ROI being an unbiased estimate of stock return—the joint hypothesis of zero intercept and unit slope—could be rejected on the basis of a significant intercept. Given the likely existence of positive present value of growth opportunities, ROI should understate stock return.

unlikely that we would find the associations the CAPM implies, or even those found in tests of the CAPM based on stock price data.

Empirical limitations. The notion that risk is an exogenous factor influencing return may be especially inappropriate in a strategic context (Bettis, 1982). Risk, which is likely to be influenced by strategic management decisions—as is return—should be considered an endogenous variable in a larger system of equations. For example, a firm's promotional expenditures might reduce its beta by stimulating sales and ROI in periods of weak demand. Further, ROI may in turn influence promotional expenditures, thus creating a simultaneity between return and beta that, uncaptured in a least-squares regression, would bias results. However, the systematic risk of a business to a large extent depends on the nature of the business itself. The ability of management to influence beta and any resulting potential for simultaneity bias may well be small.

The measurement error in accounting ROI as an indicator of economic return will lead to a downward bias in estimates of beta's effects on ROI. Measurement error in the dependent variable, ROI, will still allow for an unbiased coefficient estimate of such effects, although variance in the coefficient estimate will increase. However, measurement error in accounting beta, the independent variable, will produce a coefficient estimate of systematic risk that is biased toward zero.

In this study, measurement error in estimates of beta may arise from two main sources. First, the beta measures are estimated rather than known with certainty. The standard error of each beta estimate indicates the extent of this potential for error. Second, we calculated betas from accounting ROI, which is far from a perfect measure of economic return. No study has determined the possible extent of this measurement error, but it is likely to be large. We hope, of course, that the bias created by the measurement error does not generate so much distortion as to rule out insights into the trade-off between risk and return. Using a large amount of data, as we do, can dissipate some of the problems of measurement error.

Estimating Beta and Unsystematic Risk

An initial step in determining the association of risk and return is to estimate both systematic risk and unsystematic risk for businesses in the data base. We used Equation 2, an operational definition of the CAPM expressed in terms of risk premium, to estimate beta for each SBU:⁵

$$(ROI_{jt} - R_{Ft}) = \alpha_j + \beta_j \times (R_{mt} - R_{Ft}) + \epsilon_{jt} , \quad (2)$$

⁵Although this is the most frequently used formulation for obtaining an estimate of accounting beta, others have been recommended. Calculating accounting beta in terms of cash flows or growth rates of ROI are two commonly advocated alternatives. Analysis based on alternative beta measures is a possible direction for future research.

where ROI_{jt} = return on investment of business j in year t , R_{Ft} = long-term bond rate of U.S. government securities for year t ,⁶ R_{mt} = average ROI of all PIMS business units for year t , and α_j and β_j = coefficients to be estimated. This equation also provides an estimate of the unsystematic risk of an SBU—the standard error of the residual ϵ_{jt} denoted as σ_j .

Statistical Procedures

Least-squares estimation of Equation 2 will, under the usual assumptions, produce the best unbiased linear estimates of beta. Using empirical Bayes procedures will, however, provide beta estimates with a lower mean square error than those obtained through least-squares estimation. These procedures, described in the Appendix, were especially suitable for this research, which entailed relatively few time series observations and much cross-sectional information. They permit adjustment of raw beta estimates, an adjustment that will be greater if a beta estimate has an unusually large difference from the average and/or if the estimate has an unusually large variance. In our context, outliers and large variance estimates were common because of the relatively short time series. We expected substantial improvement in the accuracy of the beta estimate through use of those empirical Bayes procedures.

RESULTS

Influences of Risk on Return

Table 1 presents the means, standard deviations, and interseries correlations of: ROI, measured as the deviation of ROI from the long-term U.S. government bond rate; systematic risk, measured by beta; and unsystematic risk, measured by the standard error of unsystematic return (σ_j , the standard error of the residual of Equation 2). Table 1 gives statistics for the entire group of businesses and for three subgroups:⁷ (1) consumer goods businesses, (2) capital goods businesses, and (3) materials, components, and supply businesses.

Table 2 presents the results of a regression of annual ROI on systematic risk and unsystematic risk, which indicate that for the entire group of businesses, both components of risk are significantly associated with ROI. The coefficients 2.86 and .22 indicate that a premium is attached to the assumption of both types of risk. As we anticipated, a nonnested hypothesis test (Hotelling, 1940) indicated that systematic risk has significantly more power in explaining ROI than does unsystematic risk. The correlation of beta

⁶ This estimate of the risk-free return, obtained from the *Business Conditions Digest* (U.S. Department of Commerce, 1985), was used to approximate the maturity of a business unit. The return is, in fact, only risk-free if held to maturity.

⁷ We calculated ROI as the difference from the risk-free rate so as to better induce stationarity in the series and thus justify the pooling of the time series and cross-sectional data. As the Stein estimator takes a weighted, rather than simple, average of the least squares estimates of beta, the mean value of the empirical Bayes estimate of beta is not 1.00:

TABLE 1
Descriptive Statistics for Return and Risk

Variables	All Businesses	Consumer Goods Businesses	Capital Goods Businesses	Materials, Components, and Supply Businesses
ROI				
Means	17.50	14.94	15.10	19.59
Standard deviations	31.00	30.26	30.54	31.36
Correlations				
with systematic risk	.20	.21	.18	.21
Correlations				
with unsystematic risk	.12	.13	.00	.22
Systematic risk (β)				
Means	0.93	0.90	1.08	0.88
Standard deviations	2.08	2.13	1.96	2.10
Correlations				
with unsystematic risk	.01	.14	.01	.00
Unsystematic risk (σ)				
Means	15.39	12.83	18.60	15.41
Standard deviations	15.41	10.48	23.86	12.95
Numbers				
of observations	5,455	1,394	1,099	2,962

TABLE 2
Results of Regression of ROI on Components of Risk^a

Coefficient Estimates	All Businesses	Consumer Goods Businesses	Capital Goods Businesses	Materials, Components, and Supply Businesses
Intercepts	11.52** (.60)	8.62** (1.26)	12.52** (1.23)	9.17** (.88)
Systematic risk (β_j)	2.86** (.20)	2.82** (.37)	2.86** (.47)	2.92** (.26)
Unsystematic risk (σ_j)	.22** (.03)	.29* (.08)	-.03 (.04)	.51** (.04)
R ²	.05	.06	.03	.09
Degrees of freedom	5, 452	1, 391	1, 096	2, 959

^a Standard errors are in parentheses.

* $p < .05$

** $p < .01$

with ROI ($r = .20$) is significantly stronger ($p = .001$) than the correlation of unsystematic risk with ROI ($r = .12$).

The association of systematic risk with ROI is significant ($p = .001$) and extremely similar in magnitude for each of the subgroups. The association of unsystematic risk with return is less uniform across the business groupings. It is positive and significant for consumer goods businesses and for businesses producing components, materials, and supplies, but small and insignificant for capital goods businesses.

However, the regression results shown in Table 2 must be interpreted cautiously. The model does not include a number of other factors that have been theorized and shown empirically to be correlated with return. Studies of the association between risk and return using stock price data have not usually taken the absence of these factors into consideration, as current stock prices are thought to incorporate all available pertinent information. Since the return to a firm is not similarly inclusive, correlations between some of these omitted factors and the risk terms could cause bias and inconsistency in coefficient estimates of the risk terms' effects on ROI. A number of studies (e.g., Bettis, 1982; Subrahmanyam & Thomadakis, 1980) have suggested that both systematic and unsystematic risk may be correlated with strategic factors that also influence ROI. Lessening the possibility of omitted variable bias required formulating a model depicting the principal determinants of return.

Other Factors Influencing Profitability

The PIMS data base includes a host of potentially relevant variables that investigators have used in efforts to develop models to explain cross-sectional differences in ROI (Abell & Hammond, 1979; Branch, 1980; Gale, Heany, & Swire, 1977). We selected 13 variables that previous researchers have regarded as the most important determinants of profitability.⁸ They include market share; level of vertical integration; marketing intensity; capacity utilization; relative price; relative cost; relative quality; relative newness of products; market growth; relative expenditures for sales force, advertising, and promotions; and relative image of products.

Market share may affect profitability because firms with high market shares can employ economies of scale and scope, or market power. Vertical integration is important in that it allows firms the option of not sacrificing high margins to other members of the vertical system. The less a firm's excess or underutilized capacity, the higher its return. The ability to charge a high price may represent a firm's success in differentiating its product from the competition, and thus it may be associated with high return. A low relative cost position allows for higher return because a firm need not pass all of its cost savings along to customers as low prices. High product quality

⁸For a discussion of the theoretical and empirical justification of the variables used in the model, see Klein and Leffler (1981), Phillips, Chang, and Buzzell (1983), Porter (1980), and Schoeffler and colleagues (1974).

is theorized to lead to high return, since customers may be willing to pay a premium for high quality. Introducing new products indicates an SBU's ability to innovate, which should be a differentiating factor allowing for high return. With higher market growth, price competition decreases, and return increases. A good image results in a halo effect allowing a firm to charge a high price. Finally, the effects on return of such marketing variables as marketing intensity and expenditures for sales force, advertising, and promotions are not clear. However, studies have shown that these variables tend to be negatively associated with return, possibly because firms overspend on marketing.

In assessing the effects of risk on return, it is important to control for factors influencing profitability that, if omitted, could bias the estimates of risk. Studies (Freeman, Ohlson, & Penman, 1982; Jacobson & Aaker, 1985) have found that lagged values of accounting return have the largest amount of explanatory power in predicting current accounting return. Lagged ROI is able to capture a number of firm-specific factors that influence current ROI—even factors such as management quality and luck, which may be difficult, if not impossible, to measure. Cross-sectional studies often do not include lagged dependent variables as explanatory factors, although they are rather common in time series studies.⁹ Their inclusion in the model should add considerably to its explanatory power and act as an excellent control to reduce omitted variable bias. In fact, ROI lagged for one year explains more of the variation in ROI than the estimate generated by the PIMS equation for ROI using 28 variables.

The likely collinearity between lagged ROI—or any of the other variables in the model—and the risk measures will not cause inconsistent estimates of the effects of risk on return. Possible collinearity tends to increase the standard errors of coefficients, but it still allows for obtaining consistent estimates of the coefficients and standard errors in a model. This increase in standard errors is not an especially serious problem in our analysis; the large number of pooled time series, cross-sectional observations available in the PIMS data base should alleviate the consequences of even extreme multicollinearity.

Estimated Influences of Risk

Modeling the effects on ROI of (1) ROI lagged one and two years, (2) the 13 variables theorized to influence ROI, and (3) the measures of systematic and unsystematic risk should reduce omitted variable bias. Coefficient estimates better depicting the trade-off between risk and return should be possible. Table 3 presents the results of estimating this model for the 1,376 businesses in the PIMS data base and for each of the business groupings. The coefficients for β_j , the measure of systematic risk, were significantly positive for all businesses and for each of the three business groupings. In terms of

⁹The use of lagged values as surrogates for other factors is, in fact, the basis for the Box and Jenkins (1980) approach to time series analysis.

TABLE 3
Association of Risk with ROI
Controlling for Other Influences^a

Coefficient Estimates	All Businesses	Consumer Goods Businesses	Capital Goods Businesses	Materials, Components, and Supply Businesses
Intercepts	-24.39** (3.06)	-18.31** (6.55)	-9.31 (8.86)	-34.77 (3.93)
ROI lagged one year	.62** (.01)	.68** (.03)	.53** (.03)	.60** (.02)
ROI lagged two years	.05** (.01)	.12** (.02)	-.05 (.02)	.08** (.02)
Market share	.07** (.02)	.10** (.03)	.06 (.04)	.07** (.02)
Vertical integration	24.66** (1.78)	20.72** (3.19)	33.23** (4.99)	24.80** (2.35)
Marketing intensity	-33.46** (4.05)	-17.76** (5.82)	-89.95** (8.96)	-9.98 (7.96)
Capacity utilization	.16** (.01)	.15** (.02)	.16** (.03)	.21** (.02)
Relative price	.09** (.03)	.07 (.05)	.09 (.08)	.10* (.04)
Relative cost	-.09** (.03)	-.08 (.06)	-.24 (.07)	-.07 (.04)
Relative quality	.04** (.01)	-.01 (.02)	.06* (.03)	.04** (.01)
Relative newness of products	.01 (.02)	-.02 (.04)	.01 (.05)	-.02 (.04)
Market growth	.05* (.02)	.01 (.05)	.09 (.05)	.03 (.04)
Relative sales force expenditures	-.02 (.29)	-.33 (.48)	-.04 (.68)	.53 (.41)
Relative advertising expenditures	-.14 (.30)	-.72 (.44)	.05 (.73)	-.60 (.47)
Relative promotional expenditures	-.24 (.34)	-.73 (.50)	.55 (.84)	-.20 (.51)
Relative product image	.33 (.35)	.58 (.60)	.87 (.90)	.30 (.46)
Systematic risk (β_j)	1.72** (.13)	1.25** (.21)	1.97** (.34)	1.93** (.18)
Unsystematic risk (σ_j)	.16** (.02)	.18** (.04)	.07* (.03)	.25** (.03)
R ²	.62	.73	.53	.62
Degrees of freedom	5, 437	1, 376	1, 081	2, 944

^a Standard errors are in parentheses.

* $p < .05$

** $p < .01$

explanatory power, beta is one of the most important factors influencing ROI. Thus, the CAPM risk measure does contribute to the ROI model. The effects of beta shown in Table 3 (1.72 for all businesses) are smaller than those shown in Table 2, which is consistent with the judgment that the inclusion of the other factors in Table 3 removed omitted variable bias. This estimated effect of beta on ROI is about one-eighth of the value of the average risk premium for the period that the CAPM would postulate under the conditions of stock market investment. This smaller than postulated value is an expected consequence of the measurement error present in the beta estimate.

Given the small number of observations used in estimating accounting beta—from 5 to 13 annual observations—the accuracy of the beta estimate is suspect. As measurement error in an independent variable leads to downward bias, the finding of a highly significant association indicates the power of the CAPM in depicting the association between return and risk. The measurement error will lead to an estimate of the effect of accounting beta on ROI that understates the underlying effect. In the bivariate regression case, this understatement is a factor of $1 + (\sigma_\eta^2/\sigma_\beta^2)$, where σ_η^2 is the variance of the measurement error η , and σ_β^2 is the variance of the accounting beta.

Using this formula, and estimates of σ_η^2 and σ_β^2 based on calculations of the variance of empirical Bayes estimates suggested by Morris (1983), and the output of the empirical Bayes estimation procedure described in the Appendix, we could obtain a crude indication of the effect of the measurement error. We estimate the downward bias resulting from this measurement error to be substantial—on the order of 60 percent, which suggests that a more accurate estimate of the effect of beta on ROI in Table 3 would be 2.9 rather than the reported 1.72. Even this estimate should be taken as a lower bound, because other measurement error resulting from the use of accounting data can be expected to produce additional downward bias.

Unsystematic risk also had a significant influence on ROI for the entire group of businesses and for each of the subgroupings. This significant effect, which is inconsistent with the CAPM's predictions in the context of the stock market, might be an outgrowth of empirical limitations, or it might reflect conditions in strategic context differing from those postulated by the CAPM. Since the consequences of some kinds of unsystematic risk may greatly influence a business and its managers, an association between unsystematic risk and return seems theoretically reasonable.

Despite all the caveats, the findings suggest the extent of the association between risk and return. As financial theory suggests, there is an association between systematic risk and return, measured by accounting beta and accounting return, respectively, across each of the business subgroupings. The effects of beta are highly significant and, even without attempting to adjust for the bias from measurement error, among the most important explanatory factors of ROI. For the entire group of businesses, beta's standardized regression coefficient of .12 is lower in magnitude only than those of ROI lagged one year and vertical integration, which had standardized regression coeffi-

cients of .63 and .13, respectively.¹⁰ Factors such as capacity utilization, market share, and market growth, which have received a great deal more attention in the literature investigating strategy, had smaller effects as evidenced by their standardized regression coefficients of .09, .04, and .007, respectively.

Unsystematic risk was also found to have a highly significant effect on return. Managers' careers may well depend on consequences related to this type of risk. In the absence of any premium, strong incentives exist for managers to emphasize businesses with low unsystematic and systematic risk. However, as the coefficient of .16 for the entire group of businesses indicates, there is a premium attached to unsystematic risk.¹¹ Although somewhat small in magnitude, unsystematic risk's standardized regression coefficient of .08 was among the largest observed. The fact that the effects of unsystematic risk are smaller than those of systematic risk is consistent with the notion that even managers can sometimes do away with some of the adverse consequences of unsystematic risk through diversification.

To provide another perspective on the effects of the risk terms on ROI, we obtained an average value and a value below which 95 percent of the SBUs would fall for both components of risk. Multiplying these values times the regression coefficients yields a measure of their effects on ROI. Thus, the contribution of systematic risk is 1.6 percent (160 basis points) for the average firm and 7.1 percent for a business that is in the 95th percentile with respect to systematic risk. Similarly, unsystematic risk contributes 2.5 percent for the average business and 6.1 percent for a business in the 95th percentile. Clearly, these numbers are substantial enough to affect choices of strategies.

The factors that cause return are for the most part unquantified in our model and, for that matter, in other models of ROI. Lagged ROI has far and away the most power in explaining current return. The factors that lagged ROI hypothetically represents—luck, shocks, and quality of management—remain unquantified. It is also possible that ROI may be reflecting some elements of risk not captured by the empirical risk measures used in the analysis. Since our estimated risk measures may not fully capture the under-

¹⁰We do not use the more common term for standardized regression coefficient—beta weight—for obvious reasons.

¹¹The different components of this unsystematic risk measure will have different associations with ROI. For instance, unsystematic risk contains variation resulting from managerial actions as well as variation resulting from external shocks. Unlike uncontrollable unsystematic risk, the variation in ROI driven by marketing programs—controllable unsystematic risk—may not be undesirable, because it may actually represent a high level of control over the environment. To obtain estimates of the associations of controllable and uncontrollable unsystematic risk, we separated unsystematic return into the part influenced by strategic factors and the part not influenced by these factors. The standard errors of these estimates were taken as indicators of controllable and uncontrollable unsystematic risk, respectively. We then reestimated the Table 3 model with unsystematic risk replaced with these two components. As anticipated, uncontrollable unsystematic risk had a positive (.21) and significant effect. Consistent with the idea that controllable unsystematic risk is actually desirable, it had a significant negative (−1.14) effect. For further details and a discussion of this analysis see Aaker and Jacobson (1988).

lying risk of a business, other measures may serve as proxies for this unmeasured risk. Future research directed at isolating the causes of the predictive power of lagged ROI would be useful in providing both a better understanding of profitability and the influence of risk.

IMPLICATIONS

Any and every type of analysis or decision based on profitability should control for different levels of risk; all else being equal, an analysis that does not give incentives to engage in inappropriately risky ventures. We have suggested how different types of risk can be quantified and introduced into strategic decision making. The role of risk in explaining differences in profitability has implications for both researchers and managers.

Researchers cannot ignore the role of risk in influencing return in profitability models; rather, they can expect both systematic and unsystematic risk to have substantial effects—relative to other key strategy variables like vertical integration, market share, and product quality—in explaining ROI. Profitability models need to depict the role of risk, not only to explain return better, but also to avoid effects of omitted variable bias on the coefficients of other influences on profitability. The extent of such bias will depend on the association of the risk measures with these other strategic factors. Research assessing the influence of strategic factors on risk is clearly needed to provide insights into the risk characteristics of strategies theorized to influence return.

A number of studies have looked at the association of total risk and return in order to assess whether synergistic effects exist between firms' business units. It is important to recognize that financial theory posits that diversification can be expected to reduce total risk by reducing unsystematic risk. Reduction of total risk is thus not evidence of synergy. Diversification designed to reduce unsystematic risk is likely to be of little value and may actually diminish a corporation's value if investors can reduce unsystematic risk more efficiently in another way. The appropriate test of synergy involves assessing whether the trade-off between return and risk is better for a corporation as a whole than its separate components indicate.

One of the most important managerial implications of the role of risk pertains to assessing the performance of different business units. A high return may merely reflect the high risk of an SBU, rather than superior performance of a business area or of management. Businesses with high risk should be required to have higher average rates of return than businesses with low risk.

Strategic choices may affect risk as well as return. For example, managers can use promotional expenditures to affect the systematic risk of their businesses. Using a fixed percent-of-sales decision rule to set promotional budgets—which implies cutting back promotional expenditures in bad times and increasing them in good times—will exacerbate systematic fluctuations. Firms following this practice will have higher systematic risk, and we must question if this high systematic risk is compensated by higher return.

Managers need estimates of systematic and unsystematic risk to make the types of adjustments we suggest. They can obtain these estimates by taking the stock price betas of firms in similar industries as guides and estimating SBU betas subjectively, or by estimating Equation 2. In fact, a manager is likely to get better estimates than those obtained in our analysis by using quarterly or monthly data, instead of the annual data available to us, because the greater frequency allows for more observations and the selection of a time period more characteristic of the current risk conditions facing a business.

The exact trade-off between risk and return is subject to question and further study. The CAPM dictates that the relevant measure for the evaluation of the profitability of a business or project is return adjusted to reflect the systematic risk (beta) of a business and the economy-wide return. However, this measure may not be appropriate in a strategic context. The results presented in Table 3 suggest that a one-unit increase in systematic risk is associated with a 1.72 percent increase in return (172 basis points), and a one-unit increase in unsystematic risk tends to be associated with a 0.16 increase in return. This might serve as a starting point for adjusting return so that it is appropriate compensation for the different types of risk.

However, the extent of these average risk premiums requires further research and thought. As was discussed, empirical limitations in these estimates make them lower bound estimates. In addition, it is unclear if businesses should be compensated for additional unsystematic risk. Attaching a risk premium to unsystematic risk may not be in the best interests of stockholders; an association may suggest that shareholders need to take actions that better insure management is acting in their best interests. Or perhaps the trade-off between unsystematic risk and return is an unavoidable consequence of the impossibility of providing management compensation agreements insuring that managers will act strictly as agents for shareholders. Allowing this premium may be the best way to protect all stakeholders. Corporate policy might well establish risk premiums for both systematic and unsystematic risk in order to evaluate businesses' profitability. Future research determining the appropriate risk/return trade-offs in strategic contexts should be directed both at current and ideal policies. Research in this area should consider financial theory, as well as its lack of direct applicability in the strategy context.

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APPENDIX

Empirical Bayes Estimates of Beta

Stein (1955) showed that it is possible to uniformly improve maximum likelihood estimates (MLEs). His process decreases total square error in estimates of several parameters from independently normal observations; the estimates of individual values of beta for each of a large cross section of SBUs that we required are an example. In effect, Stein estimators take a weighted

average of the MLE and a fixed point estimate, usually the average value of an entire sample of MLEs. Stein estimators are often called "shrinkage estimators," as they operate by shrinking each parameter estimate towards a fixed point. Any specific Stein estimate cannot be expected to outperform any specific maximum likelihood estimate, but the set of Stein estimates should outperform the set of maximum likelihood estimates.

A number of studies have extended and generalized Stein's results (e.g., Efron & Morris, 1973, 1975). The most relevant extension for this study would appear to be use of a Stein estimator allowing the variances for the estimates of beta for the different business units to be unequal. Assuming that

$$\beta_i | B_i \sim N(B_i, D_i) \quad i = 1, \dots, k,$$

and

$$B_i \sim N(B, A) \quad i = 1, \dots, k,$$

a Stein estimator of the underlying beta of a particular business unit ($\hat{\beta}_i^*$) can be defined to be

$$\hat{\beta}_i^* = \bar{B} + c(\hat{\beta}_i - \bar{B}),$$

where $\hat{\beta}_i$ is the least-squares estimate of β_i , \bar{B} is an estimate of B , and $c = 1 - [\hat{D}_i / (\hat{A} + \hat{D}_i)]$, with \hat{D}_i being the least-squares estimate of the variance of β_i for an individual business unit, and \hat{A} being an estimate of the variance of B_i about the mean value B .

The Stein estimate is composed of the maximum likelihood estimator and the mean of an entire sample of MLEs. The value c has the effect of shrinking the estimator to the sample estimate of the mean of beta. The shrinkage is greatest as c approaches 0 and least as c approaches 1. By allowing for different variances, D_i , the procedure shrinks the estimate closer to the mean the larger the variance of the estimate, and it allows for less shrinkage for estimates with smaller variances.

The estimates of $\hat{\beta}_i$ and \hat{D}_i can be obtained from least-squares regressions of Equation 2. We obtained the estimates of \bar{B} , which is the weighted sample mean, and \hat{A} , an estimate of the unknown total variance A , via the iterative procedure described in Fay and Herriot (1979).

Although Stein's results were written as a statistical paradox, they have a straightforward, empirical Bayes interpretation. Robbins (1955) showed that it is possible to achieve the same minimum risk associated with Bayes's rule without knowledge of a prior distribution, as long as the number of means being estimated is very large. Because we estimated beta for some 1,300 SBUs, with limited time series data for each, we expected substantial improvement through use of Stein estimates. However, given the small amount of time series data, we could not test for the extent of the improvement, but instead had to rely on findings reached by other studies (Efron & Morris, 1973).

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TWO-TIER WAGE STRUCTURES: IMPLICATIONS FOR EQUITY THEORY

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This study is an application of equity theory to an examination of the effects of implementing a two-tier wage structure. Using data from 1,935 employees in retail stores, we assessed commitment to union and employer, perceived pay equity, and the union's perceived instrumentality regarding pay. Significant multivariate and univariate differences emerged for wage tier, part- or full-time status, and—among low-tier employees—work location. Results generally suggest that equity theory appears as a useful conceptual framework for examining two-tier wage structures.

Two-tier wage structures, in which the top rate of pay for new employees is substantially lower than that for old employees, are becoming a common form of union concession (Harris, 1983; Ruben, 1984, 1985).¹ Although all concessions are controversial, two-tier wage structures generate a special set of controversies. Employers seem to favor them (Flax, 1984); unions and employees have varied reactions, ranging from acceptance to striking to avoid them (Curley & Helyar, 1983). Under a two-tier wage structure, company tenure or date of hiring is the only criterion used to place an employee in a high- or low-wage tier. Because employees with the same job titles and duties thus receive different pay outcomes for similar inputs of effort, two-tier structures violate the basic union tenet of equal pay for equal work. Such structures may, therefore, affect employees' perceptions of equity (cf. Adams, 1963).

Except for impressionistic reports and news articles, literature concerning employees' attitudes in two-tier settings is nonexistent. Equity theory offers an especially appropriate approach to understanding and predicting

The authors would like to thank Lizabeth Barclay, John Gilbert, Robert Heneman, Raymond Lee, Thomas Naughton, Gregory Oldham, and the anonymous reviewers for their many helpful comments and suggestions. Portions of this paper were presented at the 1985 annual meeting of the Industrial Relations Research Association, New York. This research was conducted in part under the senior author's ANR Pipeline Company Business Administration Fellowship.

¹ Two-tier plans may take different forms. Jacoby and Mitchell (1986) found most to be temporary arrangements in which newly hired employees worked their way up to a higher wage scale for prior employees. Only 30 to 40 percent were permanent, as was the structure we studied.

employees' attitudes in such a setting.² It posits that perceptions of equitable pay play an important role in defining attitudes and behaviors concerning employment because individuals attempt to equate their ratios of outcomes to inputs with the ratios of relevant others (Adams, 1963; Ditttrich & Carrell, 1979; Mowday, 1983; Pritchard, Dunnette, & Jorgenson, 1972; Vecchio, 1984).

Although most past studies of equity theory have been conducted in laboratories (Mowday, 1983), two-tier wage structures provide a naturally occurring situation in which to apply this theory. Such wage structures are likely to be related to employees' perceptions of equity and to related attitudes and behaviors. In terms of equity theory, two-tier wage structures are likely to alter employees' perceived outcome-input ratios and thus may affect their levels of effort and commitment, their feelings about pay, and more. This exploratory field study considered the implications of using equity theory as a basis for relating situational factors relevant to two-tier wage structures to employees' attitudes concerning (1) pay equity, (2) their union's instrumentality in obtaining fair pay, (3) commitment to their union, and (4) commitment to their employer.

EQUITY THEORY AND TWO-TIER WAGE STRUCTURES

Pay Equity

The concept most often examined in studies of equity theory is pay equity, the degree to which employees perceive their pay to be fair (cf. Mowday, 1983). Equity theory suggests that individuals may choose from one or more different referents—or standards—in determining the equitableness of their pay (Goodman, 1974; Hills, 1980; Mowday, 1983; Oldham, Kulik, Stepina, & Ambrose, 1986; Ronen, 1986). Among the most theoretically and empirically important referents are internal comparisons with persons holding the same or different positions within the same organization and external comparisons with persons similarly employed in other organizations (Hills, 1980). Employees also may choose family members as referents, or may take as their standard how well their pay meets their needs, their current level of pay relative to their pay history, or the structural and administrative aspects of an organization's compensation plan.

Although little is known about how individuals select referents for equity comparisons, hypotheses for this study followed previous research (Goodman, 1977; Oldham et al., 1986) suggesting that selection of referents is a function of both the availability of information concerning certain referents and their attractiveness or relevance for a comparison. Goodman further suggested that the attractiveness of a referent is related to its instrumentality in satisfying needs.

² Other theoretical frameworks may also be useful in explaining the effects of such wage structures. These include behavioral commitment theory (Salancik, 1977; Staw, 1974) and social construction of reality theory (Salancik & Pfeffer, 1987).

In a unionized situation, labor agreements and union newspapers provide relevant information.³ Labor agreements present information about wage tiers, rates, and benefits, and union newspapers may report changes in rates of pay at competing firms. Thus, employees can readily make internal and external comparisons with relevant others. A relationship is therefore likely to exist between position on a wage tier and an employee's perceptions about pay.

Union's Instrumentality Regarding Pay

This second relevant concept is defined as a union's perceived usefulness to its members in obtaining fair pay. Literature reviews and theory on union organizing (Kochan, 1980; Summers, Betton, & DeCotiis, 1986) have suggested that a union's perceived instrumentality and employees' general attitudes toward unions operate independently. Thus, a union's usefulness in obtaining fair pay provides an alternative basis for employees' evaluations of both fairness of pay and of the union. We expected a relationship between employees' wage tiers and their perceptions of their union's instrumentality in obtaining fair pay.

Organizational Commitment

Commitment—whether to union or employer—is important both as an attitude and as an indication of willingness to work toward the goals of a relevant organization (Gordon, Philpot, Burt, Thompson, & Spiller, 1980; Mowday, Steers, & Porter, 1982). Brooke (1986) linked commitment to equity theory, establishing a positive relationship between commitment and the concept of distributive justice, which is the degree to which employees receive fair rewards for their contributions, efforts, or inputs on behalf of an organization. Rhodes and Steers (1981) found that perceived pay equity was positively related to commitment.

News analyses have suggested that changes resulting from the institution of a two-tier structure negatively affect employees' attitudes and their willingness to work toward the goals of both their employer and union (e.g., Harris, 1983; Ross, 1985; Seaberry, 1985). In addition, organizational behavior theorists (e.g., Daft & Steers, 1986) have also suggested that two-tier plans were not designed to enhance employees' motivation.

HYPOTHESES

To investigate employees' attitudes on pay equity and their union's instrumentality in obtaining fair pay, as well as their commitment to both union and employer, we framed hypotheses in terms of three situational factors—wage tier, work location, and employment status.

³ The employees surveyed were asked to demonstrate their knowledge of their labor agreement. On a 5-point scale, both mean and mode were 3, representing a moderate knowledge of the contract. When we asked employees to indicate how many issues of the union newspaper they had read in the prior year, the average was 6, but the mode was 10, or all of the issues.

Wage Tier

Occupying either a high or low wage tier determines both rate of pay and the rate progression for employees. The predictions of equity theory are consistent with the conclusions drawn from news reports that low-tier employees resent or are frustrated about their lower pay, considering it as less fair than the pay of high-tier employees (Ross, 1985; Seaberry, 1985). Such conclusions assume an internal referent; however, even if employees in the same job class on different tiers used the same external referent, low-tier employees would still be likely to perceive less pay equity than those on the high tier. Further, these low-tier employees would perceive that their union had obtained less than fair pay for them.

According to equity theory, employees might also perceive pay inequity when they believe they are overpaid (cf. Mowday, 1983). We do not predict, however, that high-tier employees who could see themselves as overpaid in relation to a low tier will perceive pay inequity, but rather that these employees will view their pay rate as the historical standard rate and therefore use their pay history rather than the low-tier rate as their relevant referent (Goodman, 1974).

The implementation of two-tier structures may negatively affect the relationships and attitudes of both low- and high-tier employees toward union and employer. Wessel (1985) reported that low-tier employees were unenthusiastic about their union. Harris (1983) noted critics who said that such structures may be a sellout of future generations, a challenge to union brotherhood, and a divisive force because they create distinct employee classes. Such statements reveal a general affect and also reflect on the level of commitment, implying that if a union does not negotiate a two-tier structure, new employees will have higher union commitment to it. Further, Ross (1985) quoted sources who concluded that low-tier employees were bitter and less productive than high-tier employees, which is consistent with predictions based on equity theory that employees who perceive their pay as inequitable are less productive than those who perceive high equity (Mowday, 1983). It also suggests that low-tier employees will have less commitment to their employer than they would if there were no low tier.

Implementing such structures also appears to negatively affect the commitment of employees who could occupy the high-wage tier. For example, employees have struck to avoid two-tier structures (Curley & Helyar, 1984). They have also voted down such plans even if that meant resisting a union hierarchy (Harris, 1983; Ruben, 1984). In these situations, employees have opposed the goals of employer or union. Employees—and unions—may recognize that accepting a low wage tier may not only divide employees, but may also lead to an employer's demanding to reduce high-tier wages in future negotiations (Winter, 1984). Following the initial concession of a two-tier structure, subsequent negotiations may set high-tier rates at a level equal to those of the low tier, with the result that high-tier rates are lower than they would otherwise have been (Wessel, 1985). In such instances, the

referent for the former high-tier employees would likely be the pay schedule that they believe would have existed in the absence of the two-tier structure. Thus, in these circumstances, high-tier employees would be likely to have lower commitment than if there were no two-tier structure. However, because news analyses have suggested that two-tier structures may negatively affect the commitment of both high- and low-tier employees, we make no prediction about commitment in relation to tier.

Hypothesis 1: High-tier employees will perceive pay equity and their union's instrumentality regarding pay to be significantly higher than will low-tier employees.

New and Old Work Locations

Another factor that could influence attitudes is the establishment of new work locations after the implementation of a two-tier plan. Indeed, companies wishing to expand may negotiate two-tier plans to lower the marginal labor costs involved in expansion and thus be better able to meet nonunion competition (Harris, 1983; Salpukas, 1985). Establishing new work locations also creates new unionized positions, which increases members' job security. In locations where an employer has hired a mostly new workforce, the proportion of low-tier employees would be high and pay rates within job classes would be relatively homogeneous. Because of turnover, the old work locations would have relatively similar proportions of high- and low-tier employees and relatively heterogeneous pay rates within job classes.

Perceived internal mobility or opportunities for promotion are likely to be greater in new locations with newer workforces than in old work locations.⁴ This argument is relevant because Patchen (1961) found that employees who perceived the best chances for mobility within their company selected referents that resulted in more favorable equity ratios than other employees. Further, because two-tier structures generally represent a union concession, often made to increase members' job security (Cappelli, 1983), employees at new locations would be likely to see the creation of their jobs as a partial result of the implementation of a two-tier structure.

Given the greater perceived internal mobility and greater homogeneity in pay at new locations, employees would be more likely to use referents supporting a favorable evaluation of their pay than would employees in old work locations. The relatively homogeneous pay rates would also be likely to lead employees in new locations to perceive that the union had been helpful in obtaining fair pay for its membership. Further, employees within each tier in new locations would be more likely to perceive their inputs as producing greater nonpay outcomes like relatively higher job security than their counterparts in old locations. Brooke's (1986) theory and the findings of Rhodes and Steers (1981) relate such outcome-input ratios and levels of perceived pay equity positively to commitment. The discussion leading to

⁴ Among the employees surveyed, employees in new work locations reported significantly higher ($p < .001$) opportunities for promotion than those in old work locations did.

Hypothesis 1 suggested likely differences in attitudes between employees on high and low wage tiers. The arguments just presented suggest that we also need to distinguish between tiers at old and new work locations.

Hypothesis 2: Within each tier, employees in new work locations will perceive pay equity and their union's instrumentality regarding pay to be significantly higher and will express significantly higher commitment to union and employer than will those in old work locations.

Part-Time and Full-Time Employment Status

Although there are relatively few unionized part-time employees, they tend to receive significantly higher wages and better fringe benefits than nonunion part-timers.⁵ Following the findings of Logan, O'Reilly, and Roberts (1973) and the discussion in Miller and Terborg (1979), we concluded that part-timers would be likely to compare themselves to other part-timers, and full-timers to other full-timers. Using an external referent, unionized part-timers would be likely to perceive pay equity and their union's instrumentality regarding pay to be higher than full-timers would. Further, the relationships of the wage rates of the two groups to each other and to going rates in the external labor market suggest that unionized part-timers have less employment mobility for equivalent positions than do full-timers. Since previous research has found employment mobility to be an important predictor of commitment (Martin, Magenau, & Peterson, 1986; Mowday et al., 1982), this suggests a greater commitment among part-timers than among full-timers to both union and employer.

Hypothesis 3: Compared to full-time employees, part-time employees on both high and low wage tiers and at both new and old work locations will perceive pay equity and their union's instrumentality regarding pay to be significantly higher and will express significantly higher commitment to union and employer.

Two-tier wage structures often reduce pay rates, earnings, and benefits proportionately more for full-timers than for part-timers (Agreement Between Giant Eagle Markets, Inc. and Local 23, United Food and Commercial Workers International Union, 1983, 1984; Bureau of National Affairs, Inc., 1978, 1986). In addition, in situations where all employees begin as part-timers and only move into full-time positions when openings occur, there will be proportionately more part-timers on the low tier than on the high tier. A two-tier plan that reduced full-timers' earnings proportionately more than

⁵ There are few studies in this area. Mellor and Stamas (1982) found the weekly earnings of part-timers to be about 30 percent of those of full-timers. Nollen and Martin (1978) found that the part-timers' disadvantage in regard to fringe benefits was even greater. However, the weekly earnings of the part-timers we surveyed were more than half of those of similarly situated full-timers. Further, fringe benefits were substantially equivalent for both part- and full-timers, except that part-timers had no insurance coverage for dependents and their days off were prorated.

those of part-timers would change both the historical pay relationships between those two groups and how they view internal referents. Thus, if similarly situated employees on the high tier serve as referents, the internal pay referent for low-tier full-timers would be relatively higher than that for low-tier part-timers.

Hypothesis 4a: At both old and new work locations, the differences in perceived pay equity and the union's instrumentality regarding pay expressed by part- and full-time employees on the low tier will be significantly greater than the differences in these perceptions expressed by part- and full-time employees on the high tier.

A two-tier plan would also be likely to have different effects on commitment for part- and full-time employees. The changed relationships of each group's pay rates, earnings, and benefits to those of the other group and those of external referents would result in the outcome-input ratios of full-timers being more unequal than those of the part-timers, and this inequality would be more marked on the low tier than on the high tier. Thus, we would expect relatively less difference in perceived employment mobility on the high tier than on the low tier. Given the relationship between employment mobility and commitment, we predict:

Hypothesis 4b: At both old and new work locations, the differences between the levels of commitment to union and employer expressed by part- and full-time employees on the high tier will be significantly greater than the differences in those levels expressed by part- and full-time employees on the low tier.

METHODS

Setting and Population

The retail stores where we conducted this research were unionized over 30 years ago. The union remained independent of the American Federation of Labor-Congress of Industrial Organizations (AFL-CIO) until the summer of 1978, when, in a divisive campaign, the membership voted to affiliate with a large AFL-CIO international union. In November 1978, the union members ratified a contract establishing a lower wage tier for all employees hired after that date except those in skilled trades. In return, the company implicitly agreed to open new stores. When the contract was renewed in August 1981, the union agreed to continue the two-tier structure in exchange for an explicit company plan to open new stores. Between November 1978 and October 1983, when data collection took place, several stores opened, employing approximately 1,700 additional workers.

In October 1983, a questionnaire was mailed to all 10,036 rank-and-file members in the bargaining unit; however, 1,171 employees who were in skilled trades and 1,293 who were hired after April 1, 1983 were not eligible for this study because they would be members of a third tier with lower

benefits that had been instituted on that date.⁶ Another 884 were employed in stores excluded from the study,⁷ leaving 6,688 possible respondents. Of the 2,966 questionnaires returned to us, we used 1,935 in our data analyses; eliminated questionnaires were from 371 skilled-trade respondents, 146 respondents hired after April 1, 1983, and 275 respondents in excluded stores. We also eliminated 203 questionnaires with indeterminate or missing data on a factor in the research design and 36 questionnaires with missing data on the dependent variables. This left 29 percent of the possible respondents in the study.

To assess the representativeness of our data, we compared several characteristics of the whole population with those of the respondent group and found certain significant differences ($p < .001$). The group of respondents contained slightly more women (69 vs. 65%), food department employees (72 vs. 64%), full-time employees (34 vs. 26%), and high-tier employees (60 vs. 51%). This group was also older and had higher seniority in the firm, with average differences of approximately one year, and it also had a higher rate of pay, with an average difference of approximately 50 cents per hour. Respondents did not differ significantly from the population in terms of marital status and work location in new or old stores. Although there was some response bias, we judged the data to be adequately representative for an exploratory study.

Measures

Factors. The research design included four two-level factors. Tier differentiated between (1) high-tier employees, those hired before November 5, 1978, and (2) low-tier employees, those hired after that date but before April 1, 1983, when the third tier went into effect. At the time of this study, more than two-thirds of all employees were in three job classes. The differences between the wages of high- and low-tier employees who were in those three job classes at the tops of their wage scales ranged from \$.39 to \$2.04 per hour.

Store differentiated (1) employees at new stores that were opened after November 5, 1978, and (2) employees at old stores, those opened before that

⁶ Because low-tier employees did not receive benefits until they had been employed for six months, the eligibility for benefits of individuals hired after April 1, 1983 was the same at the time of the October 1, 1983 data collection as if they had been hired on the low tier. Thus, we excluded these employees because they were essentially on a temporary benefit tier lasting for six months before the new third tier, with reduced benefits, became effective.

⁷ A potential confounding of attitudinal differences would exist if the proportions of employees within each alternative on each factor varied substantially by location. Thus, we excluded from analyses stores that differed substantially on any factor from the other stores within the old or new store groups. Excluded were one old store and two new stores that had significantly different proportions of full-timers than the other stores and three others that had only food departments. One of the excluded new stores had the highest turnover of any store surveyed, and the other had just opened when the questionnaire was mailed. Those two new stores were also the only ones having significantly more third-tier employees than the other stores. A comparison between a MANOVA with all the stores and one with the six stores excluded showed the same significant effects, except for a significant effect for tier on union commitment.

date. The numbers of high-tier employees at the six new stores were fairly low, ranging from 5 to 20 percent; the numbers of high-tier employees at the 21 old stores were moderately high, ranging from 43 to 62 percent.

Status differentiated (1) part-time employees, those regularly working fewer than 32 hours per week, and (2) full-time employees, those working 32 hours or more per week. This cutoff between the two statuses followed the employer's definition. The employer guaranteed 40 hours weekly for 80 percent of full-time employees and provided insurance coverage for dependents only for full-timers. All workers began in part-time positions and, if they wished, moved into full-time ones as openings occurred; however, many preferred part-time status. There were significantly more full-time employees on the high tier than on the low tier—45 versus 18 percent. Percentages of part-time employees ranged from 72 to 81 percent in the old stores and from 72 to 86 percent in the new stores.

A fourth factor, department, was added to control for differences in employing departments, because employees in food departments earned \$3.50 per hour more than general mercantile employees. Department differentiated (1) employees in food departments, and (2) employees in general mercantile departments. Proportions of food department employees ranged from 59 to 73 percent in the old stores and from 67 to 79 percent in the new stores. Overall, on the high tier there were significantly more food workers (47%) than general mercantile workers (41%). As a result of there being more food department workers on the high tier and their higher wages, low-tier employees earned approximately three dollars less per hour than high-tier employees. Further, employees in food departments were significantly more likely to be part-timers (81%) than were general mercantile employees (68%). Therefore, with only one exception, the part-timers within each tier-by-store group earned more per hour than their full-time counterparts.

Part-timers also worked approximately 20 hours per week less than full-timers and low-tier employees worked approximately one and one-half hours less per week than high-tier employees. The cumulative effect of department, pay rate, and hours worked meant that the average weekly pay for low-tier part-timers was approximately \$67, or 33 percent, less than it was for part-timers on the high tier; low-tier full-timers earned approximately \$150 (39%) less than their high-tier counterparts. Average length of time in a job class also had an effect, with low-seniority and thus low-tier employees less likely to be at the top of the 12-to-48-month rate progressions for their particular job classes.

Dependent variables. The Appendix shows scale items and response formats for the four dependent variables. Because questionnaire space was limited, we measured union's instrumentality regarding pay with a single item developed for this study.

Abbreviated versions of longer scales developed by previous research (Gordon et al., 1980; Mowday et al., 1982) were used to measure commitment to union and employer; though abbreviated, they yielded fairly sizable estimates of internal consistency reliability (union commitment, $\alpha = .78$;

employer commitment, $\alpha = .88$). The scale measuring commitment to union consisted of three items developed by Gordon and colleagues that loaded high on their first factor, union loyalty. Another study (Martin et al., 1986) reported that this three-item subscale had a correlation of .86 with a scale for union commitment that included all the Gordon items applicable where the union-shop form of union security existed. The employer commitment scale, adapted from Mowday and coauthors, consisted of three items that paralleled those measuring union commitment, with "employer" replacing "organization." Thacker and Fields (1986), using data from 426 union members, found that these three items had a correlation of .94 with all the positive items in the Mowday scale.

The pay equity scale consisted of three items ($\alpha = .73$) as follows: (1) an external equity item, evaluating perceived fairness of pay as compared to the pay of people doing the same kind of work for other employers; (2) an internal equity item, evaluating perceived fairness of pay as compared to that of people in the same store; and (3) an item evaluating overall satisfaction with pay. We added the last item to the scale as an indirect measure of the effects of any other referents on perceptions of pay equity. Such possible referents included an individual's pay history and structural and administrative aspects of the organization's compensation plan. This indirect measure seemed more feasible than framing items parallel to the other items attempting to measure all other referents. Since several studies have posited that pay equity leads to pay satisfaction (Dyer & Theriault, 1976; Pritchard et al., 1972), it seemed reasonable to assume that any referent used to evaluate pay equity would be related to overall satisfaction with pay. Although investigators have generally treated the two concepts as distinct, they are highly related; previous research has found correlations between them of over .80 (Institute for Social Research, 1975). Although it is not clear what referents our respondents used, we did not consider this fact crucial since we were concerned with whether different groups of employees differed on perceived pay equity regardless of their referents.⁸

ANALYSIS AND RESULTS

Table 1 shows correlations among the four factors and the four dependent variables. Because of the substantial correlations among the latter, we

⁸ Even though lack of control over choice of referents may have been a weakness, a multivariate analysis of covariance (MANCOVA), with pay rate as a covariate, showed that effects for tier and department were not significant. Effects for store and status were still significant, but less so. These MANCOVA results suggest that all four significant main effects are moderately related to pay rates and thus appear to be based at least partially on an internal referent. Further, a comparison of the MANCOVA and MANOVA results for store and status suggests that the significant MANOVA effects were based on more than just an internal referent. The effects for status and store may have partially reflected use of other referents—for instance, perhaps the status effects were also based on use of external referents. Or perhaps these effects reflected other types of outcome-input ratios—for instance, the effects for store may be related to new work opportunities and increased job security.

first used multivariate analysis of variance (MANOVA) and then applied univariate analyses of variance (ANOVAs) to assess the significance of each dependent variable. This resulted in a nonorthogonal between-subjects design with unequal cell sizes. Further, to adjust for the factors' lack of independence and to improve generalizability to other situations, we entered the factors in the following order: department, status, store, and tier. This ordering provided for a conservative test of attitudinal differences as a function of tier because differences in the other factors that might not be present in other workplaces with two tiers were taken into account first. Similarly, employment status would not confound the effects of store or location.

Table 2 presents main and two-way interaction effects for the MANOVA. All of these were significant except for the interactions of department by store and status by store. Not shown are the higher order interaction effects, none of which were significant. Although most of the multivariate effects were statistically significant, the eta-squared statistics show that only department and tier explained relatively substantial, although moderate, amounts of variance, accounting for 15 and 10 percent, respectively. The table also shows the univariate effects and the variance explained for each dependent measure. As Hypothesis 1 predicted, the significant effects for tier indicate that low-tier employees perceived pay equity and their union's instrumentality regarding pay to be lower than high-tier employees did ($-.27$ vs. $.24$, 4.80 vs. 5.31 , respectively).

To test Hypothesis 2, stating that employees within each tier in new stores will express higher levels of all the dependent measures than those in old stores, we conducted three-way (department by status by store) ANOVAs

TABLE 1
Correlations Among the Situational Factors and Attitudes^a

Variables	Means	Standard Deviations	1	2	3	4	5	6	7
Factors^b									
1. Department	1.28	0.45							
2. Status	1.34	0.48	.14						
3. Store	1.16	0.37	.00	-.05					
4. Tier	1.38	0.49	.14	-.29	.41				
Attitudes									
5. Commitment to union	3.75	1.33	.01	.06	.13	.07			
6. Commitment to employer	4.63	1.51	-.05	-.11	.06	.03	.19		
7. Pay equity	0.04	0.79	-.36	-.03	-.06	-.32	.15	.19	
8. Union's instrumentality regarding pay	5.11	1.58	-.20	-.00	-.01	-.16	.35	.14	.58

^a $N = 1,935$; for $r \geq .04$, $p < .05$; $r \geq .06$, $p < .01$; $r \geq .08$, $p < .001$, two-tailed tests.

^b Food department = 1, general mercantile = 2; part-time = 1, full-time = 2; old store = 1, new store = 2; high tier = 1, low tier = 2.

TABLE 2
Summary of Results of MANOVAs and ANOVAs

Effects ^b	Multivariate ^a Tests	Univariate Tests ^a			
		Commitment to Union	Commitment to Employer	Pay Equity	Union's Instrumentality Regarding Pay
Department	86.15*** (.15)	0.09	5.18*	329.12***	87.42***
Status	9.64*** (.02)	7.12**	23.13***	0.80	1.20
Store	14.60*** (.03)	35.65***	6.15*	9.48**	0.18
Tier	52.72*** (.10)	3.02	0.75	189.47***	45.42***
Department by status	4.23** (.01)	0.39	4.08*	6.49*	13.24***
Department by store	1.81 (.00)	1.30	1.15	5.68*	4.80*
Department by tier	4.47*** (.01)	5.11*	0.08	7.69**	0.21
Status by store	1.61 (.00)	3.32	1.33	0.63	1.69
Status by tier	5.80*** (.01)	2.15	6.73**	5.62*	12.01***
Store by tier	2.82* (.01)	2.74	0.00	7.28**	8.73**
Eta-square (η^2)	0.34	0.02	0.02	0.21	0.06

^a Values of *F* are given; multivariate eta-squares are in parentheses.

^b For multivariate effects, *df* = 4, 1,931; for univariate effects, *df* = 1,934.

* *p* < .05

** *p* < .01

*** *p* < .001

within each tier for each dependent variable. For high-tier employees, store had no significant effects for any dependent variable, offering no support for Hypothesis 2. In support of this hypothesis, however, low-tier employees in new stores scored significantly higher on all measures of dependent variables than those in old stores.

To test Hypothesis 3, which posits that part-timers will show higher levels for all four dependent variables than full-timers, we contrasted each of four sets of the eight group means shown in Table 3. Three of the four contrasts for pay equity revealed higher scores for the part-time groups than for the comparable full-time groups; only the contrast between new-store, high-tier, part-time employees and new-store, high-tier, full-time employees was not significant. Two contrasts for union's instrumentality regarding pay were significant as predicted; however, the two contrasts involving high-tier employees were not. No support for hypothesized differences in commitment to union emerged from any contrast between part- and full-timers.

TABLE 3
Group Means and Standard Deviations

Groups	N	Dependent Variables ^a			
		Commitment to Union ^b	Commitment to Employer ^b	Pay Equity ^c	Union's Regarding Pay Instrumentality ^b
High-tier/ new-store	52	3.88 (1.30)	4.71 (1.70)	.20 (.72)	5.23 (1.52)
Part-time	15	4.07 (1.39)	5.42 † (0.96)	.25 (.84)	4.73 (2.19)
Full-time	37	3.80 (1.27)	4.41 † (1.85)	.18 (.67)	5.43 (1.12)
High-tier/ old-store	1,141	3.67 (1.35)	4.58 (1.53)	.24 (.70)	5.32 (1.47)
Part-time	640	3.52 † (1.31)	4.80 † (1.44)	.32 † (.69)	5.34 (1.49)
Full-time	501	3.85 † (1.38)	4.30 † (1.60)	.15 † (.71)	5.29 (1.49)
Low-tier/ new-store	265	4.19 * (1.15)	4.86 * (1.40)	-.12 * (.84)	5.13 * (1.32)
Part-time	210	4.18 (1.20)	4.85 (1.45)	-.04 † (.82)	5.27 † (1.47)
Full-time	55	4.25 (0.93)	4.92 (1.19)	-.43 † (.84)	4.60 † (1.63)
Low-tier/ old-store	477	3.68 * (1.33)	4.59 * (1.49)	-.36 * (.79)	4.61 * (1.75)
Part-time	405	3.69 (1.32)	4.60 (1.46)	-.30 † (.77)	4.71 † (1.73)
Full-time	72	3.63 (1.40)	4.56 (1.66)	-.72 † (.84)	4.07 † (1.79)

^a Standard deviations are in parentheses.

^b These scales used 7-point formats with higher values more favorable.

^c This scale is formed from standardized items with a mean of 0 and a standard deviation of 1.

* New-store scores differ significantly ($p < .05$) from old-store scores within the same tier.

† Part-time scores differ significantly ($p < .05$) from full-time scores within the same tier/store group.

Further, contrary to the predictions of Hypothesis 3, full-timers had significantly higher commitment to the union than part-timers for high-tier employees working in old stores. However, in both high-tier groups, part-timers showed significantly higher commitment to their employer than full-timers. There were no significant differences on employer commitment in the low-tier groups. Hypothesis 4a stated that the differences between part- and full-timers concerning pay equity and union's instrumentality regarding pay

would be greater for the low-tier groups than the high-tier groups, and Hypothesis 4b stated that the differences between part- and full-timers on commitment would be greater for the high-tier groups than the low-tier groups. To test these hypotheses, we examined interaction effects in three-way ANOVAs for each dependent variable, analyzing department by status by tier within the new- and old-store groups. In addition, we examined the eight means for each variable shown in Table 3 to determine the direction of the differences indicated by any significant interaction effects.

For employees of new stores, significant status-by-tier effects emerged for commitment to employer and union's instrumentality regarding pay. Examination of the four means for new stores indicated that the difference between part- and full-timers' levels of commitment to employer was significantly greater among high-tier than low-tier employees, thus supporting Hypothesis 4b. However, the differences for union's instrumentality regarding pay were essentially the same in magnitude (.70 vs. .67) on each tier, although their directions differed from our predictions. Thus, that significant interaction effect did not support Hypothesis 4a.

In contrast, results from the employees of old stores supported Hypothesis 4a. Both the significant status-by-tier interaction effects for pay equity and union's instrumentality regarding pay and the means in the old stores, shown in Table 3, indicated that the differences between levels for the part- and full-timers were significantly greater among low-tier employees than among high-tier employees. Results from old-store employees also supported Hypothesis 4b, as the significant status-by-tier effects among the commitment measures and an examination of their means indicate. For both forms of commitment, differences were significantly greater between high-tier part- and full-timers than between low-tier part- and full-timers.

DISCUSSION AND CONCLUSIONS

This study explored the application of concepts of equity theory to a two-tier wage structure. With one exception, all the significant results were consistent with predictions derived from equity theory. Low-tier employees perceived significantly lower pay equity and instrumentality of the union regarding pay than high-tier employees. In addition, low-tier employees in new stores had significantly higher levels on all dependent measures than low-tier employees in old stores. When part-timers were contrasted with full-timers on pay equity, the first were higher in every group except the new-store, high-tier group; on union's instrumentality regarding pay, only part-timers in the low-tier groups were higher; and on commitment to employer, only part-timers in the high-tier groups were higher. Among employees working in old stores, differences were greater between low-tier part- and full-timers on pay equity and union's instrumentality regarding pay than they were for comparable high-tier employees, and differences were greater between high-tier part- and full-timers on commitment to union and employer than they were between comparable low-tier employees. Finally, in new

stores, the part- and full-timers' differences on employer commitment were greater on the high tier than on the low tier. Overall, the results of this study provided support for equity theory in a field setting, thus extending the range of organizational phenomena to which equity theory is relevant to include two-tiered wage structures and part- and full-time employment status.

Self-selection of work location and employment status by employees would be unlikely to cause the differences in attitudes we found at the time of the study. It also seems unlikely that the employer placed people with different attitudinal predispositions into the high or low tiers, the new or old stores, or part- or full-time positions. Instead, employees' particular wage tiers, locations, and statuses were likely to have caused the attitudinal differences that emerged. Our argument here follows Adams, Laker, and Hulin (1977), who stated that employees' attitudes are more a function of their particular work situations than of the characteristics they bring to work. Canonical correlation analyses of our data provided further support for this argument. We found that five demographic variables—gender, age, marital status, number of children, and education—accounted for only 3.4 percent of the variance in the combined set of the four dependent measures, but that the organizational and structural variables of pay rate, hours worked per week, seniority, department, part- or full-time status, old or new store, and high- or low-tier status explained 12.4 percent of the dependent measures' variance.⁹

The findings of this study suggest that management and unions consider several matters that are partially under their control before they advocate or reject a two-tier approach. These include the opening of new work locations and the distribution of high- and low-tier employees among these locations. For example, if a firm establishes new work locations or operations after negotiating a two-tier structure and permits few high-tier employees to transfer to them, the new structure may have fewer detrimental effects on employees' attitudes. Other considerations include changing part- and full-time employees' relative earnings, pay rates, or distribution between tiers.

Although this study goes beyond anecdotal evidence to provide empirical information concerning two-tier wage structures, it has limitations. Because it was exploratory, because the amount of variance explained for some effects and variables was low, and because we excluded six unrepresentative stores, further research is needed. A replication with different employers, unions, and industries would be useful and could also test other hypotheses. Particularly important would be an exploration of the degree to which em-

⁹ Further, to examine the potential confounding effects of those same demographic variables on the results, they were used as covariates in a MANCOVA. The significant main and two-way interaction effects at both the multivariate and univariate levels were almost identical to those reported in this study. However, because the covariates were closely related to the factors, violating the homogeneity of regressions assumption, we did not report these MANCOVA results.

ployees perceive any relationships between two-tier wage structures and their job security or the existence of their jobs.

Because the roles of referents may vary with tier, location, and status, further research should explore the actual referents employees use in determining whether they are equitably paid. Both the results reported here and equity theory suggest that attempts to balance ratios of inputs like effort, attendance, and promptness to outcomes like rewards and punishments may decrease productivity among low-tier employees. Thus, it would be useful to examine the effects of tier, work location, employment status, and the attitudes we examined on inputs, productivity, and such objective measures of political support for a union as decertification, voting for incumbent union officers, and ratifying contracts. Finally, although equity theory appears intuitively appealing for examining issues associated with two-tier wage plans, future researchers may want to test the efficacy of other theoretical frameworks in studying such structures.

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APPENDIX

Measures of Dependent Variables

Except where noted, the following items had 7-point response formats ranging from 1 = strongly disagree to 7 = strongly agree.

Commitment to union:

- I talk up Local [X] to my friends as a great organization to be a member of.
- My values and the Union's values are not very similar. (Reverse scored)
- I feel a sense of pride being a part of Local [X].

Commitment to employer:

- I talk up this employer to my friends as a great employer to work for.
- I find that my values and my employer's values are very similar.
- I am proud to tell others that I am part of my employer's organization.

Pay equity:

- My pay is not fair compared to the pay of other people in my unit. (Reverse scored)
- My pay is fair compared to the pay of other people doing the same kind of work.
- How satisfied are you with the pay that you receive here? 1 = very satisfied to 4 = not at all satisfied (reverse scored).

Union's instrumentality regarding pay:

- Local [X] has helped us to obtain fair pay.

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ERRATA

In Jordan (*Academy of Management Journal*, 29: 405–412), Table 2 on page 409 should have read:

TABLE 2
Means and Standard Deviations
for Two Dependent Measures

Times	Groups	Shifts	Intrinsic Motivation		Satisfaction with Pay	
			Means	s.d.	Means	s.d.
Before	Task non-contingent	1	5.30	.350	8.75	2.98
		2	5.04	.704	18.75	8.24
	Performance contingent	1	5.60	.492	8.62	5.47
		2	6.08	.320	11.12	10.05
After	Task non-contingent	1	5.81	.161	6.50	4.55
		2	5.52	.537	14.75	13.56
	Performance contingent	1	5.29	.879	11.06	11.00
		2	5.89	.277	13.10	10.53

Also, throughout the text, the control group should have been called *task noncontingent* rather than *not contingent on performance*.

APPLYING UTILITY CONCEPTS TO A TRAINING PROGRAM IN SUPERVISORY SKILLS: A TIME-BASED APPROACH

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An application of utility analysis concepts, this study employed a quasi-experimental design to demonstrate the effects of a training program in supervisory skills on the performance ratings of 65 bank supervisors. We expanded the utility formula presented by Schmidt, Hunter, and Pearlman, incorporating economic considerations suggested by Boudreau in a time-based framework. Results indicated considerable dollar benefit to the organization from training supervisors. The utility formula was modified to permit examination of influences of adjusting various parameters of the model and of training additional groups on overall utility benefits.

Applied research in the behavioral sciences has shown an increased awareness of utility concepts in recent years (Boudreau & Berger, 1985; Cascio, 1982; Landy, Farr, & Jacobs, 1982; Schmidt, Hunter, & Pearlman, 1982). Those studies have suggested that the dollar value of various personnel programs has gone largely unnoticed or has been considerably underestimated in the past. Schmidt, Hunter, McKenzie, and Muldrow (1979) demonstrated the cost-effectiveness of using valid selection procedures. Several papers have presented examples of the potential benefits of employee training programs in dollar values (Boudreau, 1983b; Landy et al., 1982; Schmidt et al., 1982), but empirical data from actual applications in organizational settings are lacking.

The purpose of this study was to apply utility analysis to a training program in supervisory skills conducted in a bank. Further, we expanded the utility formula presented by Schmidt and his colleagues (1982) to include parameters suggested by Boudreau (1983a, 1983b) in order to calculate utility benefits over time.

The authors are grateful to Terry Dickinson, Scott Tannenbaum, and three anonymous reviewers for their many helpful comments and suggestions on an earlier version of this paper. We would also like to thank Charles Woodworth for his effort and contributions on the cost accounting portion of the study.

A Utility Formula

Schmidt, Hunter, and Pearlman (1982: 335) derived the following formula for assessing the dollar value of a training program:

$$\Delta U = T N d_t SDy - N C, \quad (1)$$

where

ΔU = the dollar value of a training program,

T = the duration, in number of years, of a training program's effect on performance,

N = the number of individuals trained,

d_t = the true difference in job performance between the average trained and the average untrained employee in units of standard deviation,

SDy = the standard deviation of job performance in dollars of the untrained group,

and

C = the cost of training per individual.

This formula essentially embodies a static, single-group design that assesses the utility of conducting a training program on a single group of individuals and does not take into account the influence of employee flows or the effects of adding training groups. Boudreau (1983b) noted that these deficiencies could lead to considerable underestimation of the utility of a training program but alternatively demonstrated (1983a) how previous applications of the formula may have overestimated marginal utilities because they failed to incorporate economic considerations into the derivations of overall utility gains. He suggested the addition of three economic parameters to the model: (1) *variable costs*—costs that covary with productivity increases, such as bonuses or commissions; (2) *organizational marginal tax rates*—the tax rate applicable to changes in reported profits attributable to a training program; and (3) *discounting*—adjusting for the fact that revenue gained in later years is worth less than revenue gained at the time of training, since present money can at least be invested at prevailing interest rates. Boudreau (1983b) derived a utility formula that takes into account the influence of both employee flows and economic parameters on marginal utility estimates. We slightly modified Boudreau's formula in order to derive ongoing marginal utility estimates and to assess better the utility of conducting a training program in supervisory skills in a time-based framework.

A Time-based Utility Model

Schmidt and his coauthors (1982) suggested that the effects of a training program on performance (d_t) may diminish over time. To account for this phenomenon, they proposed that estimates of marginal utility be multiplied by a value representing the midpoint of the period over which training is expected to last. However, since organizations only gain utility benefits from

trained individuals who remain with them, the effect of turnover on the size of a trained group of individuals must be taken into account (Boudreau & Berger, 1985). Previous applications of concept of utility analysis have multiplied projected benefits by the mean tenure of individuals in a given job class. For training interventions, the number of trained individuals should be adjusted downward by the mean percentage of turnover in a job class over the period of time that utility benefits are computed. The utility benefits from training additional groups of employees also need to be taken into account in order to assess fully the impact of a training program.

McKeon (1981) and Cascio (1982) described detailed procedures for estimating the cost of conducting training. However, their procedures should be modified to provide cost estimates that distinguish nonrecurring from recurring costs. Organizations absorb nonrecurring costs during the development of a program; they include equipment purchases and trainers' salaries during the period. Recurring costs are absorbed each time a program is presented; they include session expenses like the cost of facilities and trainers' salaries, and costs corresponding to the number of participants in a program, such as training materials and trainees' salaries. Separating costs in this fashion permits the incorporation of each into utility calculations for the time periods in which an organization actually incurs each expense. Thus, a program's high initial expenses may indicate that costs exceed benefits for the first few training groups or first few years of operation. However, at a certain point an organization may actually derive benefit from a program; this point represents the beginning of the payback period. This approach will clarify information for decision makers regarding the utility of personnel programs in a return-on-investment framework (Cronshaw & Alexander, 1985).

Equation 2 expands Schmidt and colleagues' formula to allow calculation of utility estimates that take into account the influences of turnover, diminishing effects of training, and estimated costs over one-year periods. We chose the one-year metric because it coincides with the typical period of organizational budget decisions and with the publication of information pertaining to several parameters of the formula, such as yearly reports on turnover and applicable tax rates.

$$\Delta U_k = \sum_{g=1}^{G_k} (N_{gk} SD_y d_{t_{gk}} - C_k), \quad (2)$$

where

- k = the number of years over which utility estimates are calculated,
- ΔU_k = the marginal utility gained in year k ,
- G_k = the total number of groups trained through year k ,
- N_{gk} = the number of trainees in group g in year k adjusted for turnover,¹

¹ If the average percentage of yearly turnover for a job class is set at M , the following computation adjusts for the first-year value: $N_{g1} = N_{g0} (1 - M/2)$. Subsequent yearly values are computed as follows: $N_{gk} = N_{gk-1} (1 - M)$.

SD_y = the standard deviation of performance in dollar units,
 $d_{t_{gk}}$ = the effect size estimate for training group g in year k ,²
 and
 C_k = the costs incurred in year k .

For training interventions, Equation 2 calculates the cost value for the groups trained in year k . Naturally, the first-year cost value would also include the costs of program development. Use of Equation 2 permits estimation of utility gains in any given period or over any specified length of time after training occurs. However, as Boudreau (1983a) noted, these estimates must be adjusted for economic considerations for them to reflect accurately the organizational benefits of increased productivity. Equation 3, which expands Equation 2, includes the influences of discounting, tax rate, and variable costs:

$$\Delta U_k = \sum_{g=1}^{G_k} \frac{1}{(1+i)^k} [N_{gk} SD_y (1+V) (1-TAX_k) d_{t_{gk}}] - [C_k \frac{1}{(1+i)^k} (1-TAX_k)], \quad (3)$$

where

i = the discount rate,

V = the variable costs,

and

TAX_k = the organizational tax rate for year k .

Several features of this formula should be highlighted. As does Boudreau's (1983b) application, Equation 3 provides a more complete and precise definition of utility than earlier utility models did, as well as a method for projecting costs and benefits over time. It is algebraically the same as Boudreau's (1983b) Equation 5, with one major difference: whereas Boudreau's equation sums the number of treated employees in a workforce in each future time period and multiplies by a constant effect size, Equation 3 allows both the number of treated employees in a workforce and the effect size to vary according to the time of treatment. When the effect size parameter is held constant, Equation 3 is algebraically equivalent to Boudreau's Equation 5.

² Assuming there is some reduction in the effectiveness of training over time, the most representative estimate of first-year size (d_t) is that which exists six months after training. In the present case, we obtained our criterion measure approximately six months after employees had completed training. Effect size estimates obtained at other times would require adjustment in order to align them with the six-month period. Setting the average percentage of yearly decrease in effectiveness of training at P , we computed subsequent yearly values as follows: $d_{t_{gk}} = d_{t_{gk-1}} (1 - P)$.



Two other minor differences between the two equations should be noted. First, we replaced the terms $(r_{x,sv})$ (\bar{Z}_x) with d_t , the appropriate effect size estimate for a training intervention. Second, we discounted the costs associated with training in the same period when benefits would begin to accrue; the exponent for the discount factor for costs is k rather than $k - 1$. The basis for this decision was the fact that there was no appreciable time lapse between development and implementation of the particular training program we studied (cf. Boudreau, 1983b: 399, footnote 1).

METHODS

Participants

All participants worked at a bank in the Southeast that employs approximately 3,000 people. Personnel records indicated that 65 individuals had completed a training program in supervisory skills in the previous year. The bank had solicited participants through general company announcements and memos sent directly to each branch and department; employees either nominated themselves to participate or were nominated by their supervisors. No systematic data were available regarding how well the trainees represented all eligible employees. However, as discussed below, we assessed several variables other than training that can influence employees' performance and used them to compare trainees to a control group constructed post hoc.

Training Procedures

The training program in supervisory skills that the bank used is a commercially available system; it is designed to be presented by trained in-house employees and utilizes a modular, behavior modeling format. The bank ran five training programs, each of which met for four full-day sessions, one a week for four weeks. During each session, a trainer led the group in a discussion of common work situations requiring supervisory action, such as improving subordinates' performance or giving recognition; participants viewed a film depicting a supervisor effectively handling an appropriate situation, received a list of three to six learning points or "key actions," discussed the effectiveness of the model in demonstrating the key actions, and then role-played the desired behaviors either in small groups or in front of the entire group. Other participants gave feedback on their performance to those who took roles. The sequence was repeated over three or four modules during each session. Trainers advised participants to keep the handouts listing the key actions and other training materials at hand in their work settings.

Quasi-experimental Design

The 65 trained individuals represented three job classes at the bank; there were 10 head tellers, 36 branch managers, and 19 operations managers. Head tellers supervised other tellers working at their branches in addition to themselves performing teller duties. Branch managers supervised all of a

branch's employees in addition to performing duties like handling loan transactions. Operations managers held an assortment of positions, such as security officers, accountants, and group leaders in computer programming.

A post hoc, quasi-experimental design was constructed to examine the effects of training on individuals' performance (Cook & Campbell, 1979). Because individuals had not been randomly assigned for training, we made an effort to match a control group ($N = 65$) to trainees on all performance-relevant variables retrievable from personnel records. Using a complete listing of the company's personnel, we selected individuals for the control group from the same job classes and geographical locations and matched them to trainees on the bases of salary, tenure, gender, and age.

Comparisons between the trained and control groups on the matching variables revealed no significant differences: salary $\bar{x} = \$19,652$ vs. $\$20,408$; tenure, $\bar{x} = 10.32$ vs. 11.43 years; gender, 29 vs. 34 percent men; and age, 39.39 vs. 39.41 years.

In addition to the matching information, for a proxy pretest measure (Cook & Campbell, 1979: 112–115) we obtained from personnel records the most recent performance appraisals completed prior to training for trained individuals and appraisals from the corresponding time period for members of the control group. The performance appraisals consisted of a 30-item scale on which supervisors rated each subordinate, with 1 = performance is well below expected levels to 5 = performance consistently exceeds superior levels in performance goals and quality. Some representative rating dimensions were volume of work, ability to learn new duties, and delegating duties and authority. The coefficient alpha for a unit-weighted composite of these ratings was .93.

Although the bank uses such appraisals primarily for administrative and compensational purposes, it is reasonable to expect them to correlate with other performance indicators, and therefore they may be used to help to equate the training and control groups statistically. The training group and the control group did not differ significantly on the performance appraisal measure ($t_{128} = .37, p > .10$).

Research Procedures

Supervisors ($N = 62$) of employees in the trained and the control groups were asked to participate in an evaluation study that the Human Resource Planning and Development Department of the bank conducted approximately six months after employees completed training. Each supervisor received a packet containing a cover letter and two parts. The cover letter explained that the purpose of the study was to evaluate the effectiveness of several training programs and related activities currently being conducted and to determine the need for various types of additional programs.

For the first part of the evaluation study, supervisors estimated the dollar value to the bank of three levels of performance on the part of employees. They assigned dollar values to performance in the 15th, 50th, and 85th percentiles. We used these estimates to compute values of SDy for the three

job classes: head tellers ($N = 19$), operations managers ($N = 25$), and branch managers ($N = 18$). The instructions and wording for estimating each of the three percentiles of performance were essentially the same as those described by Schmidt and his colleagues (1979) and by Bobko, Karren, and Parkington (1983).

The second part of the evaluation study asked supervisors to evaluate from one to nine subordinates on an 18-item rating scale; the number depended on how many of the individuals in the trained and control groups reported directly to them. We took care not to identify which Human Resource Planning and Development program was being examined or which of the employees being rated had been trained. Since people in both the trained and the control groups had participated in various programs presented by the department, we felt the potential biasing effect of knowledge of the treatment was minimal.

Measurements

Performance measure. The rating scale contained two items for each of nine performance dimensions that the bank had identified during a redesign of its performance appraisal system for supervisors shortly before the present study. These items appear in the Appendix. Since the estimates of SDy and the utility of the training program pertain to overall job performance (Schmidt et al., 1979), we used a single unit-weighted composite of the items as the criterion measure ($\alpha = .90$).

Training costs. An internal audit conducted by the Human Resource Planning and Development Department provided data on costs. Following the outlines and formulas presented in McKeon (1981) and Cascio (1982), we identified these nonrecurring or program development costs: (1) trainers' materials and video tapes, \$10,000; and (2) salaries, benefits, and travel for trainers for five days, \$2,800, for a total one-time cost of \$12,800.

Recurring costs break down into the fixed and variable costs associated with conducting each training program. Fixed costs per program included: (1) trainer's salary and benefits for four days, \$670; (2) equipment and materials for four days, \$155; and (3) facilities for four days, \$116, for a total of \$941. Five training programs were conducted during the year, three for branch managers and one each for head tellers and operations managers. Costs corresponding to the number of trainees in each program included (1) work books and handouts provided to each trainee, \$84; and (2) the average salary and benefits for four days per trainee, \$283 for head tellers, \$323 for operations managers, and \$517 for branch managers. Therefore, the variable training costs per trainee for the three job classes were \$367, \$407, and \$601, respectively.

Estimates of turnover. The bank's personnel records were examined for the five years prior to the training in order to estimate the average yearly rate of turnover for each job class. This examination resulted in the following mean values: head tellers, 12.17 percent (s.d. = 3.71); operations managers,

16.90 percent (s.d. = 6.25); and branch managers, 10.48 percent (s.d. = 3.62).

Economic factors. After consulting experts in bank finance, we determined the appropriate discount rate to be 15 percent and the applicable organizational tax rate to be 46 percent. These values seem conservative as compared to those Boudreau (1983a) suggested, 0–15 percent for the discount rate and 45 percent for the tax rate.

Discussions with bank employees revealed salary to be the only variable cost clearly and consistently associated with improvements in performance. Employees' salaries and benefits would rise to the extent that appraisals were sensitive to improvements in performance following training. We therefore reduced utility gains from training by a percentage calculated by dividing each job's variable costs by its *SDy* value. The Appendix presents the procedure for estimating variable costs as a percentage of *SDy*.

RESULTS

Effect of Training

Cook and Campbell defined the quasi-experimental design that we employed to assess the effect of training on employees' overall performance as an untreated control group design with proxy pretest measures (1979: 112–115). We used performance appraisals conducted prior to training as the proxy pretest measure in order to help reduce spurious effects of prior performance on the criterion measure represented by the 18-item supervisory rating composite. A hierarchical multiple regression analysis was performed using the correlations presented in Table 1 to determine the influence of training on performance. We regressed the criterion measure first on the pretest measure to control for any spurious pretraining differences in performance. Entered next, a dichotomous variable identifying group (control = 0, trained = 1) accounted for significant additional variance ($t_{127} = 1.77$, $p < .05$, one-tailed test). The overall equation accounted for over 24 percent

TABLE 1
Correlations, Means, Standard Deviations, and Reliabilities
for Performance Measures^a

Variables	Means	Standard Deviations	1	2	3
1. Group ^b	0.50	.50			
2. Pretest	3.49	.47	.0329	(.93)	
3. Criterion	3.66	.53	.1523*	.4751**	(.90)

^a Diagonal entries represent internal consistency estimates (α).

^b Groups were coded as follows: control = 0, trained = 1.

* $p < .05$, one-sided tests.

** $p < .01$

of variance in the criterion ratings ($F_{2,127} = 20.54, p < .001$).³ The partial correlation associated with the group variable ($r = .16, p < .05$) represents the independent effect of training on performance. Applying the conversion formulas that Schmidt and his colleagues (1982: 337) presented translates that value to a score for d_t of .3146. This value should be considered as a conservative estimate of the true effect of training on employees' performance since we did not correct the measures for attenuation (Schmidt et al., 1982).

Estimates of *SDy*

Two *SDy* distributions were computed from supervisors' percentile estimates: one by subtracting the 15th percentile from the 50th, the second by subtracting the 50th from the 85th. As in previous investigations (Bobko et al., 1983; Schmidt et al., 1979), the estimates for *SDy* that we found varied widely within each job class. Close inspection of the raw distributions for the dollar estimates of the value of performance in the three percentiles and the two *SDy* distributions produced through application of Schmidt and colleagues' procedure revealed the reasons for the large discrepancies.

For the operations managers, both of the two estimates for *SDy* from three supervisors exceeded \$86,000, and the remaining estimates for this job class were all less than \$8,000. The discrepant values may represent either outliers or actual differences attributable to different jobs. Regardless, the elimination of the three extreme estimates reduces the variance of the *SDy* distributions and produces more a conservative, lower value for *SDy*.

Additional large variances observed in the two remaining job classes were traceable to a different cause. Inspection of the raw distributions revealed that the estimated value of performance in the 15th percentile was \$0 in three cases each for head tellers and branch managers. In fact, in another instance, a supervisor estimated the utility of a branch manager's performance in the 15th percentile to be -\$35,000. Burke and Frederick (1984) and Weekley, Frank, O'Connor, and Peters (1985) also obtained zero and negative estimates for 15th percentile performers. These peculiar estimates may result from supervisors' failing to comprehend the nature of percentiles; however, they may be accurate assessments of the utility of 15th percentile performance—excessive loan losses could result in a branch manager's performance costing \$35,000. Eliminating estimates with zero or negative values reduced the variance in the two *SDy* distributions and yielded more conservative *SDy* values.

Paired *t*-tests were computed to examine whether the two trimmed *SDy* distributions differed significantly for each job class. No significant differences emerged: for head tellers, $t_{15} = .63, p > .50$; for operations managers,

³ Other analyses not reported here tested for differences attributable to job class, training session attended, influences of the matching variables on the performance rating criterion, and potential interactions. No significant relationships emerged; further details are available from the first author.

TABLE 2
Parameters of Utility Analysis Formula Varying with Job Class

Parameters	Head Tellers	Operations Managers	Branch Managers
Training costs per individual ^a	\$367	\$407	\$601
Numbers trained ^b	10	19	36
Average turnover ^c	12.17	10.48	16.90
SDy	\$2,369	\$3,123	\$10,064
Variable costs ^a	-6.68%	-7.29%	-2.87%

^a See text for computations; variable costs are expressed as percentage of SDy.

^b Figures represent actual numbers of trainees.

^c These are mean percentages computed over previous five years.

$t_{21} = .17, p > .80$; and for branch managers, $t_{13} = -.49, p > .60$. Thus, we averaged the two distributions for each job class to provide the final values of SDy for use in the utility computations: for head tellers, SDy = \$2,369 (s.d. = 837); for operations managers, SDy = \$3,122 (s.d. = 1,496); and for branch managers, SDy = \$10,064 (s.d. = 4,932).⁴

Utility Analysis

Inserting the mean SDy values computed above into Equation 5, which appears in the Appendix, yielded estimates of variable costs as a percentage of SDy as follows: for head tellers, 6.68; for operations managers, 7.29; and for branch managers, 2.87. Estimates for all of the parameters necessary for the utility analysis computations were thus available. For illustrative purposes, the following parameters remained fixed for estimates of the utility of training individuals in each job class: $d_t = .3146$, session costs = \$941, tax rate = 46 percent, and discount rate = 15 percent. Table 2 presents values for parameters that vary with each job class.

Table 3 presents projected raw and adjusted utility estimates over 20 years for individuals who were trained in the first year; estimates exclude program development costs. The second column in Table 3 presents the appropriate discount values used in computations for the adjusted utility estimates. The first column under each job class contains the projected number of trainees remaining in the organization for each year. As illustrated, this number drops below 1.00 beginning in year 19 for head tellers and does so in year 20 for branch managers. Utility benefits from training operations managers would actually continue to accrue until year 27.

The upper portion of Table 4 presents the summed total utility estimates including program development costs for some selected time periods. The

⁴ An alternative strategy to trimming the extreme estimates is to use nonparametric statistics to test the assumption that the two SDy distributions do not differ significantly (Bobko et al., 1983). Wilcoxon matched-pairs, signed-rank tests (two-sided) computed on the full distributions failed to discredit the hypothesis that the two SDy estimates were drawn from the same population ($p > .05$) within each job class. Nevertheless, we chose to use the mean SDy values from the trimmed distributions in order to remain conservative.

summed total of the raw estimates of the utility of training 65 employees is \$78,493 at the end of the first year alone. The benefits continue to rise to \$421,427 by year 5 and \$750,883 by year 20. Adjusting the raw utility estimates for economic considerations results in drastic reductions in these figures. The summed adjusted total utility estimates from training the same 65 employees drops to \$34,627 at the end of year 1, to \$148,465 by year 5, and to \$194,885 by year 20. Although still compelling, the adjusted utility estimates are substantially lower than those suggested by the raw utility formula.

The estimates entail some assumptions about the stability of several of the model's parameters. Perhaps the most tenuous assumption is that the effect of training on performance (d_t) remains constant over time; the alternative argument is that the effects of training on performance dissipate over time. In order to examine the influence of the first assumption, we recomputed raw and adjusted utility estimates for each job class with a 25 percent reduction in d_t each year. The lower portion of Table 4 shows these values. It is clear that if the effectiveness of training declines over time the apparent utility of a program is severely reduced, particularly in the later years. In this

TABLE 3
Utility Estimates for Trainees by Job Class^a

Years	Discount Values	Head Tellers			Operations Managers			Branch Managers		
		N	Raw	Adjusted	N	Raw	Adjusted	N	Raw	Adjusted
1	.870	9.39	\$2,388	\$ 902	18.00	\$ 9,015	\$3,628	32.96	\$79,890	\$36,107
2	.756	8.25	6,147	2,342	16.12	15,835	5,994	27.39	86,714	34,391
3	.658	7.24	5,399	1,789	14.43	14,176	4,666	22.76	72,060	24,851
4	.572	6.36	4,742	1,366	12.92	12,690	3,632	18.91	59,882	17,958
5	.497	5.59	4,165	1,043	11.56	11,360	2,828	15.72	49,762	12,976
6	.432	4.91	3,658	797	10.35	10,170	2,201	13.06	41,352	9,377
7	.376	4.31	3,213	609	9.27	9,104	1,713	10.85	34,363	6,776
8	.327	3.79	2,822	465	8.30	8,150	1,334	9.02	28,556	4,896
9	.284	3.33	2,478	355	7.43	7,296	1,038	7.49	23,730	3,538
10	.247	2.92	2,176	271	6.65	6,531	808	6.23	19,720	2,557
11	.215	2.57	1,912	207	5.95	5,847	629	5.17	16,387	1,847
12	.187	2.25	1,679	158	5.33	5,234	490	4.30	13,618	1,335
13	.163	1.98	1,475	121	4.77	4,685	381	3.57	11,316	965
14	.141	1.74	1,295	92	4.27	4,194	297	2.97	9,404	697
15	.123	1.53	1,138	70	3.82	3,755	231	2.47	7,814	504
16	.107	1.34	999	54	3.42	3,361	180	2.05	6,494	364
17	.093	1.18	878	41	3.06	3,009	140	1.70	5,396	263
18	.081	1.03	771	31	2.74	2,694	109	1.42	4,484	190
19	.070	<1.00			2.45	2,411	85	1.18	3,726	137
20	.061	<1.00			2.20	2,159	66	<1.00		
Totals			\$47,339	\$10,715		\$141,676	\$30,451		\$574,668	\$159,729

^a Raw estimates were computed with Equation 2; adjusted estimates used Equation 3. N = projected number of trainees remaining in the organization for each year. Dollar values exclude program development cost of \$12,800.

TABLE 4
Summed Utility Estimates for All Trainees by Job Class^a

(a) Utility Estimates Holding Training's Effectiveness Constant

Years	Head Tellers		Operations Managers		Branch Managers		Totals	
	Raw	Adjusted	Raw	Adjusted	Raw	Adjusted	Raw	Adjusted
1	\$ 2,388	\$ 902	\$ 9,015	\$ 3,628	\$ 79,890	\$ 36,107	\$ 78,493	\$ 34,627
3	13,935	5,033	39,026	14,289	238,664	95,349	278,825	108,661
5	22,843	7,443	63,077	20,749	348,307	126,283	421,427	148,465
10	37,191	9,940	104,327	27,843	496,028	153,427	624,746	185,200
15	44,691	10,589	128,042	29,871	554,567	158,774	714,500	193,224
20	47,339	10,715	141,676	30,451	574,668	159,729	750,883	194,885

(b) Utility Estimates with 25 Percent Yearly Decrease in Training's Effectiveness^b

Years	Head Tellers		Operations Managers		Branch Managers		Totals	
	Raw	Adjusted	Raw	Adjusted	Raw	Adjusted	Raw	Adjusted
1	\$ 2,388	\$ 902	\$ 9,015	\$ 3,628	\$ 79,890	\$36,107	\$ 78,493	\$ 34,627
3	10,036	3,665	28,866	10,748	185,459	75,879	211,561	84,282
5	13,355	4,572	37,814	13,175	226,467	87,561	264,836	99,298
10	15,583	4,987	44,156	14,345	250,064	92,192	297,003	105,514
15	15,859	5,013	45,021	14,425	252,283	92,408	300,363	105,836
20	15,887	5,014	45,139	14,430	252,478	92,418	300,704	105,852

^a Raw estimates were computed with Equation 2; adjusted estimates were computed with Equation 3; totals include program development costs of \$12,800.

^b Applicable effect size estimates for years given are 1 = .315, 3 = .177, 5 = .100, 10 = .024, 15 = .006, and 20 = .001.

case, the estimated adjusted utility falls to \$99,298 by year 5 and to \$105,852 by year 20. However, equally worthy of attention are the utility gains that remain, even in this conservative example.

DISCUSSION

The purpose of this study was to develop a time-based utility model for personnel programs and to illustrate its application to a training program in supervisory skills. We modified the utility formula developed by Schmidt and his colleagues (1982) to incorporate the influence of employee flows (Boudreau, 1983b) and economic factors (Boudreau, 1983a) over time. Procedures for estimating the costs associated with training presented by McKeon (1981) and by Cascio (1982) were modified to differentiate nonrecurring from recurring costs. This time-based approach provided clearer and more realistic information than has previously been available regarding the utility of training programs in terms of return on investment. To our knowledge, it is the first application of such techniques to assess the utility of a training program conducted in an actual organizational setting.

The results were compelling, not only in terms of dollar values, but also from the standpoint of the information they provided for managerial deci-

sions regarding future human resource programs in our particular setting. Recent years have seen an increased concern with the costs associated with training (Gilbert, 1976; McKeon, 1981). In this case, the cost of training 65 employees exceeded \$50,500. However, results of the utility analysis suggest that the cost of not training employees may be even higher.

Adjusted for economic factors, the net utility to the organization of training this single group of employees was over \$34,600 in the first year alone. This figure rose dramatically to over \$108,600 by year 3 and to over \$148,400 by year 5. Even if the effectiveness of training should decrease by 25 percent a year, the benefit of conducting the program is still impressive: \$84,282 by year 3 and \$99,298 by year 5. Naturally, practitioners and researchers alike may be a bit skeptical of these results. As Schmidt and his colleagues (1982) noted, we are simply not accustomed to thinking about the impact of personnel programs in economic terms. Also, since the values for SD_y and d_t were based on subjective ratings, some concern regarding the influence of measurement error on these parameters seems warranted. Boudreau (1984) developed a technique called break-even analysis to address the influence of measurement error on results of utility analysis.

Break-even Analysis

Break-even analysis is a method to determine the minimum value for SD_y that is necessary, given the other parameters of the utility model, for a personnel program to yield positive utility. Break-even values can be compared to the actual estimates of SD_y used in this study. To the extent that the break-even values approach the SD_y values used to compute the results of the utility analysis, error of measurement in obtaining values for SD_y leads to greater uncertainty regarding the utility of a program. To the extent that the break-even values are far below the actual values for SD_y used in the utility analysis, error of measurement in SD_y should have little or no influence on a decision whether or not to adopt a program. In the present context, the equation for computing break-even values using the adjusted utility analysis results presented in the top half of Table 4 is as follows:

$$U = (INC)(SD_y) - COSTS, \quad (4)$$

where

U = the summed utility gained in any particular time period adjusted for economic factors,

INC = the increase in utility for each increase in SD_y for that period of analysis and that particular group of employees,

SD_y = the estimated SD_y for that group of employees, and

$COSTS$ = the program costs for that group of employees adjusted for economic factors.

For this analysis, costs include a portion of the program development costs of \$12,800 determined on the basis of the number of employees in the particular group.

Break-even SD_y is equal to $COSTS$ divided by INC . For example, utility gained in year 1 from training ten head tellers is \$3,067. This value exceeds the \$902 value reported in Table 4 because the latter compensated for session and individual costs that the value for $COSTS$ includes in this equation. The total cost of training ten tellers—including costs per session, per individual, and 15 percent of program development, adjusted for economic factors—is \$3,089. Applying Equation 4 yields a value for INC of 2.60 and a break-even SD_y value of \$1,189, which is 50 percent of the SD_y value used in the utility analysis. Break-even SD_y values for year 1 are \$1,346 for the operations managers and \$2,389 for the branch managers, which are 43 and 24 percent of the values used in the utility computations. These break-even values for the first year are all below the lower boundary of the 95 percent confidence intervals of the SD_y distributions generated from the Schmidt et al. (1979) procedure we used. Naturally, the break-even values would continue to decrease over time as utility benefits continued to accumulate. For instance, break-even values for SD_y in year 5 would be \$576 (24%) for the head tellers, \$594 (19%) for the operations managers, and \$977 (10%) for the branch managers. It is also possible to estimate the break-even value for d_t by substituting d_t for SD_y in Equation 4. In year 1, break-even values for d_t were .1579 for the head tellers, .1356 for the operations managers, and .0747 for the branch managers.

A break-even analysis using the conservative utility values based on a 25 percent yearly reduction in the effectiveness of training (Table 4, lower portion) produces similar results. All break-even SD_y values are still less than 50 percent of the values used in the utility analysis. The values for year 5 are \$745 (31%), \$789 (25%), and \$1,309 (13%) for the head tellers, operations managers, and branch managers, respectively. These results suggest that although measurement error in SD_y or d_t may alter the magnitude of projected utility benefits, a decision whether or not to introduce a training program should be unaffected. The training program we assessed appeared to be warranted, even given large amounts of measurement error.

Employee Flow Analysis

The utility analysis presented thus far investigated only the benefit from training 65 supervisors. However, these findings underestimate the true value of the program since the analysis did not include the influence of training additional groups (Boudreau, 1983b). The utility gained from additional training must be taken into account in order to project a realistic estimate of the benefit of the training program. Equation 3 is designed to accommodate employee flows and to permit organizational decision makers to ask "what if" types of questions.

For example, a decision maker might ask what the summed overall utility of the program would be if training were conducted with additional

groups for five years. Given the turnover rates used in the analysis and the fact that the bank operates more than 120 branches, at least 15 openings in each job class should occur each year. The results in the upper portion of Table 5 incorporate the influence of projected employee flows and are based on the training of 15 new employees in each job class each year for five years.

Computed on the basis of 45 employees, the summed adjusted utility of the program in year 1 with the first group is \$13,490. The figure rises to \$104,120 by year 3 and to \$219,577 by year 5, when the last group will have been trained. The organization would continue to derive benefit from the program in later years from employees that remain in the organization. The figures in Table 5 demonstrate vividly the effects of training additional groups on overall utility estimates. The estimate for the tenth year of the utility of training 225 employees in the first five years is over \$364,300, even after adjustments for economic considerations. Equally dramatic are the differences between the raw and adjusted utility estimates. Not only is there a substantial difference in the magnitude of the two estimates, but the ratio between the two increases the further in time they are projected. The ad-

TABLE 5
Summed Utility Estimates for Training 15 Employees in Each Job Class for Five Years^a

(a) Utility Estimates Holding Training's Effectiveness Constant

Years	Head Tellers		Operations Managers		Branch Managers		Totals	
	Raw	Adjusted	Raw	Adjusted	Raw	Adjusted	Raw	Adjusted
1	\$ 4,053	\$ 1,574	\$ 6,919	\$ 2,771	\$ 33,523	\$ 15,155	\$ 31,695	\$ 13,490
3	38,701	13,385	56,952	19,807	202,855	76,938	285,708	104,120
5	101,922	30,046	147,183	43,487	472,848	152,054	709,153	219,577
10	243,788	54,732	352,868	78,863	933,925	236,776	1,517,781	364,361
15	317,934	61,147	471,119	88,975	1,116,640	253,468	1,892,893	397,580
20	356,687	62,813	539,103	91,865	1,156,522	255,456	2,039,512	404,124

(b) Utility Estimates with 25 Percent Yearly Decrease in Training's Effectiveness^b

Years	Head Tellers		Operations Managers		Branch Managers		Totals	
	Raw	Adjusted	Raw	Adjusted	Raw	Adjusted	Raw	Adjusted
1	\$ 4,053	\$ 1,574	\$ 6,919	\$ 2,771	\$ 33,523	\$ 15,155	\$ 31,695	\$ 13,490
3	30,547	10,569	45,805	15,983	171,654	65,710	235,206	86,252
5	69,575	20,795	102,277	30,745	354,287	116,614	513,339	162,144
10	115,139	29,289	167,034	42,690	510,981	147,365	780,354	213,334
15	120,790	29,813	175,869	43,501	525,716	148,802	809,575	216,106
20	121,491	29,846	177,074	43,555	526,765	148,856	812,530	216,247

^a Raw estimates were computed with Equation 2; adjusted estimates were computed with Equation 3; totals include program development costs of \$12,800.

^b Applicable effect size estimates for years given are 1 = .315, 3 = .177, 5 = .100, 10 = .024, 15 = .006, and 20 = .001.

justed estimate is 43 percent of the raw estimate in year 1 and it successively decreases to 20 percent of the raw estimate by year 20.

The figures in Table 5 also demonstrate that the utility of a training program depends in part on the types of employees trained. Clearly, the utility of training branch managers exceeds that of training operations managers—for whom there is a 5.47 to 1 ratio in year 1—or head tellers, with a 9.63 to 1 ratio in year 1. The difference is mainly attributable to the higher *SDy* estimate for branch managers. Other parameters that vary by job class, such as training costs, turnover, and variable costs, also affect utility estimates but do so in the present case to a lesser extent than *SDy*.

The summed utility estimates presented in the upper portion of Table 5 were recomputed under the assumption that the effectiveness of training diminishes 25 percent each year. The lower half of Table 5 presents the results of these analyses. Not surprisingly, the utility estimates drop considerably, but continue to demonstrate substantial economic benefit from conducting supervisory skills training; estimates are \$86,252 by year 3, \$162,144 by year 5, and \$213,334 by year 10.

Issues and Implications for Future Research

The effectiveness of training in improving overall performance obviously affects the utility of a program. Anything that influences this effectiveness has an impact on the utility derived. Similarly, any factor that may contaminate an evaluation of the effectiveness of training will bias utility estimates. The degree of confidence we can have in the validity of a value for d_t is a function of the research design employed. The quasi-experimental design we used rules out several, but not all, threats to validity (Cook & Campbell, 1979). Unfortunately, we did not have the luxury of a true experimental design. Random assignment of supervisors to training, multiple measures of the internal validity of the training, and a longitudinal assessment of the effectiveness of training could lend further support to the present findings. For purposes of comparison, however, a recent meta-analysis (Burke & Day, 1986) of 17 effect size estimates from five managerial training studies using behavioral modeling techniques and subjective behavior criteria found an average effect size estimate of .70 (s.d. = .52). After correcting the observed findings for statistical artifacts, the average effect size was estimated to be .78 (s.d. = 0.0). Thus, the present value for d_t of .3146 does not appear to be particularly atypical; yet the paucity of well-controlled empirical studies⁵ precludes a definitive statement at this time as to the effectiveness of modular, behavioral modeling training programs in supervisor skills.

As demonstrated, the duration of the effect of training on performance plays an important role in the utility computations. Schmidt and his colleagues (1982) suggested that the effect of training may decline over time. Applying utility analysis could help to identify when it would be most profitable to conduct retraining or to present refresher seminars. Alternatively,

⁵ Latham and Saari (1979), however, is a particularly good exception.

Burnaska (1976) indicated that it may take time for managers to practice the skills they have learned and for perceptions of their performance to improve. To the extent that the second position is correct, scores for d_t would increase over time as managers honed the skills that they have learned. Clearly, there is a need for longitudinal studies in organizational settings in order to begin to address the effect of time on d_t scores.

As in earlier investigations (Bobko et al., 1983; Schmidt et al., 1979; Weekley et al., 1985), the estimates for SD_y we used varied greatly within each job class. The heterogeneity of jobs within the group of operations managers and some zero—and one negative—estimates of the utility of 15th percentile performance for the head tellers and branch managers accounted for this variation. We chose to eliminate widely discrepant estimates in order to remain conservative. Future research efforts should examine the reasons for this large variation and explore methodological refinements to reduce it.

The number of employees trained has a direct relationship to the overall utility of a program. Similarly, the percentage of turnover among trained employees affects utility since an organization only derives benefits from trained employees who remain in it. We assumed that the likelihood of turnover among trained and untrained employees in a given job class was essentially equal. The utility formula will need adjustment to the extent that receiving training leads to a higher or lower likelihood of termination of employment.

The present utility model could be expanded to include the influence of training on several additional parameters. These might include the influence of training on the attitudes of trainees and their subordinates and absenteeism among them. Since the specific factors that supervisors consider when estimating SD_y are unknown at the present time, it is not clear whether or not the model takes these additional factors into account. It is clear that both employees' attitudes and absenteeism have significant bottom-line implications for organizations (Cascio, 1982).

Finally, this study used an omnibus unit-weighted supervisory rating as a performance criterion. Alternatively, examination of the specific aspects of overall performance that training affects and their relationships to SD_y may provide a clearer understanding of how training employees relates to utility.

Implications for Decision Making

The findings of this study should not be viewed as simply a thinly veiled attempt to justify a training program. The results of the utility and break-even analyses indicate clearly that the program was cost-effective. Organizational decision makers could use such information to determine the allocation of resources between personnel programs and other organizational efforts to improve productivity. Alternatively, given a limited budget, a personnel department could determine which employees should be trained first on the basis of the projected utility of training different groups of employees. Our results suggested that the utility of training branch managers far exceeds that

of training operations managers or head tellers, although training the second two groups also generated positive utility. However, the information and formulas presented here may also apply to several other types of decisions.

For example, by using the present information and altering various parameters of the utility model, a decision maker could determine the smallest number of supervisors needed to warrant presenting a program. Similarly, someone could estimate the cost-effectiveness of investing more in training—perhaps by training more supervisors or by training them sooner—relative to the utility of their performance levels. Utility analysis formulas may also be of use for organizations wondering which type of supervisory skills training would be best for their own situation. Most of the information required for the utility computations, such as turnover percentages, values for SD_y , and economic factors, may be available or may be estimated before firms choose a program. Then, for example, a decision maker could project the relative utility of various forms of managerial training using the effect size estimates reported by Burke and Day (1986) and cost surveys or estimates for the different programs. Thus, the usefulness of this study's findings goes far beyond their ability to justify the cost of a training program.

Finally, we have concentrated on the organizational benefits of training. Naturally, the participants in a program also benefit, typically in terms of self-enhancement or career development. Although they are difficult to quantify, employees and their organizations may value these benefits all the same. Thus, decisions on introducing training programs may be based on what training provides for employees rather than what it gains for the organization, or such decisions may take both beneficiaries into account.

In summary, this study demonstrated the utility of a training program in supervisory skills in a bank. In addition, we sought to identify several areas for future research and how utility theory and its applications can be used for making organizational decisions. We hope that this and other applications will help to promote greater use of utility theory and its techniques in the future.

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APPENDIX

Performance Measurement Scale

Feminine pronouns were used for ratings of women. For questions beginning with "to what extent," response alternatives ranged from 1 = not at all to 5 = to a very great extent. For other questions, responses ranged from 1 = strongly disagree to 5 = strongly agree. R indicates reverse coding prior to analysis.

Job knowledge:

To what extent is his technical/managerial knowledge and proficiency in need of further development? (R)

He keeps himself informed of events happening outside of the department that impact the function of the work unit.

Planning and organization:

To what extent does he logically group job activities to best accomplish action plans and objectives?

He seems to deal with each work-related problem as it arises and fails to anticipate future needs.

Decision making:

To what extent does he gather relevant information in order to thoroughly develop alternative solutions when making important decisions?

He displays indecisiveness when making recommendations or when taking actions, and inspires little confidence in his decisions. (R)

Communication:

To what extent does he keep subordinates, peers, and supervisors "in the dark" and fail to communicate important work-related information? (R)

He conveys an attitude or willingness to discuss ideas, problems, and concerns in a candid yet supportive manner.

Leadership:

To what extent is he effective at delegating duties and responsibilities?

He provides little guidance or direction for his subordinates. (R)

Personnel management:

To what extent does he fail to recognize, or to take action to alleviate work-related problems between employees? (R)

He compliments good subordinate performance, and takes appropriate disciplinary action with subordinates whose performance is unacceptable.

Expense management:

To what extent does he tend to exceed budget allocations or neglect the cost considerations of work? (R)

He attempts to utilize internal resources prior to tapping external sources.

Creativity and initiative:

To what extent does he fail to consider new or innovative procedures to accomplish assignments? (R)

He is always developing new and unique approaches to accomplish goals and to solve problems.

Interpersonal relations:

To what extent is he aware of the personal concerns of others?

He is not able to disagree with others without producing conflict. (R)

Calculation of variable costs:

The bank's performance appraisal system rates employees on a scale ranging from 1 to 5. Employees who receive a 3 are entitled to a set percentage of salary increase. This amount increases an additional 2 percent for employees who receive a 4 and another 2 percent for individuals who receive a 5. Since all employees in the present study received 3 or better, it follows that performance improvements would result in higher performance appraisals and subsequently higher salaries and benefits.

Given that rationale, we computed the percentage of utility benefits paid back to employees in the present case using the following equation:

$$V = \frac{[SD_p(S + B) .02]}{SD_y} \quad (5)$$

where V = variable costs, SD_p = the standard deviation of employees' performance appraisals, S = average employee salary, and B = average employee benefits computed as 33 percent of annual salary, as calculated from bank records.

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TIME TO PROFICIENCY FOLLOWING JOB TRANSFERS

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The time required by an individual to become proficient at a new job following a transfer is important to both employee and employer. This study suggested that subjective factors, such as levels of perceived support and perceived differences between new and old jobs, are more critical predictors of self-reported time to proficiency than more objective measures like frequency of previous transfer experiences, changes in function, or changes in hierarchical level.

A number of authors in recent years have advanced conceptual models concerning the socialization and resocialization processes that occur following career transitions of various sorts (e.g., Brett, 1984; Feldman, 1976; Graen, 1976; Jones, 1983; Katz, 1980; Louis, 1980; Nicholson, 1984; Pinder & Walter, 1984; Schein, 1978; Van Maanen, 1977; Van Maanen & Schein, 1979; Wanous, 1980). A general concern expressed in many of these models is the nature of the changes that can occur in employees and in the new jobs into which they move. The models suggest that the main purpose of these adjustment processes is to enable individuals to deal with the uncertainty that they encounter in new jobs so they can manage the stress that such uncertainty entails and become proficient in their jobs.

There has been a paucity of empirical research, however, to test or ground those conceptual models. A notable exception is the study conducted by Feldman and Brett (1983), who contrasted the coping strategies used by new-hires, people entering an organization for the first time, and job-changers, employees moving from one position to another within the same organization.

The primary purpose of the present study was to contribute to redressing the imbalance between the conceptual literature dealing with the dynamics of career transitions and the empirical literature related to those dynamics. Specifically, we investigated a number of factors that previous research and theory suggest may be related to how easily and how quickly employees become proficient in new jobs after job transfers. We defined a transfer as a

The authors are grateful to the Social Sciences and Humanities Research Council of Canada for partial support for this project and to our colleagues at the University of British Columbia, especially Peter Frost, Robert Modrow, Ralph Stablein, and Gordon Walter, for their insightful comments and suggestions. We also thank Jane Howell for conversations that contributed to the inception of the project.

"relatively permanent job reassignment that entails the movement of an employee within an organization from one of its operating sites to another" (Pinder & Walter, 1984: 188). By this definition, transfers may or may not entail a change in hierarchical level or a change in function; the important point is that they entail a change in geographic location for employees and their families.

Researchers have given very little attention to the concept of time to proficiency following career transitions like transfers. Following Pinder and Das (1979), we conceive of time to proficiency as the length of time that elapses between an individual's movement into a new job and ascendancy of that individual to a level of performance at which a balance between inducements and contributions (March & Simon, 1958) exists. Other authors have seen proficiency in a job following a transfer as requiring both competence in the official demands of that job and proficiency in its informal, social demands (Barnard, 1938).¹

The time employees take to become proficient after transfers has important theoretical implications as well as a number of practical implications for both transferees and their organizations. For employees, disruptions in patterns and routines, both on the job and in their personal lives, can produce anxiety and stress (Brett, 1982, 1984). The amount of stress experienced will increase directly with the degree to which total life circumstances at new locations differ from those at previous locations. For example, transfers that entail moving to geographic settings that are radically different from ones that employees are used to and that at the same time reassign them from one functional area to another and promote them to jobs with greater responsibility than before will likely be more stressful than transfers that feature less change in these geographic and job-related dimensions. Of course, part of the stress following transfers can arise from reductions in levels of employees' performance and resultant threats to their self-concepts. If the new jobs' demands are sufficiently different from those they left behind, decrements in job performance and feelings of confidence are likely to be especially pronounced (cf. Brett, 1984). Therefore, it would seem important for transferred employees to be able to reach acceptable standards of job performance as soon as possible in their new jobs.

The length of time required for transferees to become effective at new jobs can also be an important issue for organizations. In most cases, the total inducements an organization provides will exceed the total contributions an employee makes for some time during a post-transfer period of adjustment (Pinder & Das, 1979). The longer the time required for a person to adjust and become proficient, the greater the cost of a transfer to an organization. Moreover, because the occurrence of one transfer often triggers one or more other transfers to fill slots at all of an organization's operating sites, the

¹ We view self-efficacy as expectations people hold of behaving competently in particular situations, and we are not concerned with it in this study. Although perceptions of self-efficacy and perceptions of time to proficiency both involve subjective responses, the two concepts are not the same.

aggregate cost incurred until equilibrium is reached can be a multiple of the cost of the adjustment time associated with single transfers (Pinder & Das).

HYPOTHESES

Frequency of Previous Transfers

A number of theorists have discussed the importance of previous experience for enabling an individual in a new setting to cope with its requirements. For example, Louis (1980) described the roles of cognitive scripts (cf. Abelson, 1981) and sense-making practices based on previous learning for employees in new work settings. Likewise, Nicholson (1984) argued that prior socialization will be especially important in new settings that feature moderate levels of discretion. Finally, Jones wrote:

The strategies that newcomers adopt to deal with uncertainty or ambiguity and the way they make sense of a situation depend on the way they have learned, historically, to deal with new situations Thus, beyond any learned response tendencies, the extent and variety of past experiences in, for example, other organizational contexts and in dealing with a wide variety of role holders will affect the way newcomers respond to new situations (1983: 465-466).

Although Jones's reasoning seems to be concerned primarily with a person's socialization after first entry into an organization, it appears to be equally relevant to the socialization and adjustment of transferees because, to varying degrees, cultural norms and expectations, objective features of the work, and personnel differ among an organization's operating sites (Louis, 1980). The very fact that a transfer entails entry into a new role set would make Jones's reasoning applicable to post-transfer socialization processes. In short, on the basis of the work of Louis (1980), Nicholson (1984), and Jones (1983), we would expect that employees who are frequently mobile will learn how to cope in and adjust to new work settings, which will help them to become comfortable and productive more easily and faster with each successive transfer.

However, results of an earlier study failed to support this hypothesis (Pinder & Das, 1979). In that study, the correlation between a single-item self-report measure of adjustment time and the total number of transfers within an employee's present company was $-.03$, and the correlation between the total number of transfers during an employee's overall career and adjustment time was $-.01$. On balance, this evidence suggests that, in spite of the intuitive appeal of the notion, employees do not seem to learn through experience how to become proficient following transfers, so that the individual and organizational costs associated with post-transfer socialization will not decrease appreciably as experience with transfers grows. Because the self-reported estimate of time to proficiency in that study had only a single item, the failure to find stronger inverse correlations between it and the variables for experience with transfers could have resulted from the measure's having low reliability. Therefore, a secondary purpose of the present study

was to rectify that possible measurement problem and to take a second look with a new sample at the relationship between post-transfer time to proficiency and prior experience with transfers.

Hypothesis 1: The number of times an employee has previously been transferred will be negatively related to the length of time that is required for that individual to become proficient at a new job following any particular transfer.

Objective Differences Between Jobs

In one of the earliest and most influential conceptual approaches to career transitions, Schein (1971) discussed the critical importance of individuals' movements via a sequence of passages through the hierarchical, functional, and inclusionary boundaries that make up an organization's structure. He conceived of movement in one of these three basic directions within an organization as only partially correlated with movement in either of the other two. For Schein, the exact nature of the reciprocal effects between individual and organization varied in large part as a function of the particular types of boundaries any transition entails crossing. Accordingly, we reasoned that objective boundary transitions of the sort he discussed may partially influence post-transfer time to proficiency.

Hypothesis 2: Self-reported post-transfer time to proficiency will be positively related to objective increases in organizational rank.

Hypothesis 3: Self-reported post-transfer time to proficiency will be positively related to objective changes in function.

Subjective Differences Between Jobs

More recent conceptual frameworks and empirical evidence have put stress on the role of subjective or perceived differences between former and new work roles in the dynamics of career transitions. For example, "contrasts" (Louis, 1980: 236) result largely from subjective differences between old and new work settings. The empirical significance of these subjective differences in two studies concerning career transitions by Brett and her colleagues (Brett & Werbel, 1978; Feldman & Brett, 1983) confirmed their importance. Nicholson made the same point while summarizing part of his recent theory of work role transitions: "An essential feature of the theory is that it is person-centered; what is operationally important is a person's subjective perceptions of job requirements (following the reasoning that what is perceived as real is real in its consequences)" (1984: 179).

In light of these studies, we reasoned that subjective, perceptual factors may have an effect on post-transfer time to proficiency that is independent of any effects of the two objective factors.

Hypothesis 4: Self-reported post-transfer time to proficiency will be positively related to perceived increases in job difficulty.

Hypothesis 5: Self-reported post-transfer time to proficiency will be positively related to perceived increases in job complexity.

Hypothesis 6: Self-reported post-transfer time to proficiency will be positively related to perceived increases in skill requirements.

Hypothesis 7: Self-reported post-transfer time to proficiency will be positively related to perceived dissimilarity between a former job and a new job.

Support and Clarity Provided by Others

The levels and types of socio-emotional support that leaders and reference groups provide has long been regarded as a critical determinant of organizational behavior (House, 1981). Theory and research in the areas of leadership (Yukl, 1981) and group dynamics (Shaw, 1971) have supported this proposition. Moreover, the growing literature on careers and career transitions similarly attests to the role of interpersonal support in removing uncertainties, assuaging anxieties and feelings of coercion, and generally making things easier for a newcomer in a strange work setting (Brett, 1984; Feldman, 1976; Feldman & Brett, 1983; Graen, 1976; Katz, 1980; Louis, 1980).

Walter and Marks (1981) provided the general notion of support that guided our reasoning. For them, support is a "physical, emotional, or symbolic contribution to individuals increasing their net stockpile of emotional capacity to cope with change" (1981: 91). Support does not by itself cause change, but it makes change possible. We judged three particular elements of support to be especially relevant to the issue of post-transfer time to proficiency. The first included the traditional aspects of cooperation and socio-emotional support provided to transferees in new jobs by members of their role sets.

Hypothesis 8: Self-reported post-transfer time to proficiency will be negatively related to perceived cooperation from other employees in a new job setting.

Hypothesis 9: Self-reported post-transfer time to proficiency will be negatively related to the perceived level of support provided by the supervisor in a new job setting.

Hypothesis 10: Self-reported post-transfer time to proficiency will be negatively related to the perceived level of support provided by co-workers in a new job setting.

The second element concerned transferees' clarity about the requirements of their new jobs. Role clarity or ambiguity are not usually considered

to be categories of support, but because role ambiguity can be a major source of stress in workplaces (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964) we conceptualized role clarity as a feature that transferees would see as supportive and as offsetting stress.

Hypothesis 11: Self-reported post-transfer time to proficiency will be negatively related to perceived role clarity on a new job.

Finally, we included lack of pressure to relocate and adjust quickly as the third general facet of support. Previous research (Pinder, 1978) showed that such pressure is an important factor in organizational transfer policies—one that clearly relates to the overall feelings of stress experienced by an employee at the time of the transfer.

Hypothesis 12: Self-reported post-transfer time to proficiency will be negatively related to a perceived lack of pressure to relocate and adjust quickly.

METHODS

Sample and Data Collection

The sample consisted of 603 employees, mostly managers, who worked for any of eight companies in seven Canadian industries in which transfers are common: banking, engineering, retail sales, fast food, natural gas, chemicals, and transportation. The particular companies involved were those who responded favorably to correspondence from the first author inviting firms in these industries to participate. Personnel officials in the large companies randomly selected names and provided the home addresses of transferees until they reached the total number of employees their firms desired to have included in the study.² In some of the small firms, every employee who had ever been transferred was included in the study. Therefore, the final sample representing the population of transferred Canadian employees in the seven targeted industries was created by a variety of means. Usable responses arrived in late 1984 and early 1985 from 354 individuals; this figure represented an overall response rate of 58.7 percent, with response rates for the eight companies ranging from 41 to 80 percent. The mean age of the 340 men and 14 women providing responses was 39.8 years (s.d. = 8.26); over half had attended a college or university. The mean number of times they had been transferred by all employers was 3.54 (s.d. = 2.56); mean tenure with their present employers was 17.6 years (s.d. = 9.28); and mean length of time between their most recent transfers and completing the questionnaire was 27.77 months (s.d. = 39.41 months, median = 16 months). There was no relationship ($r = -.07$) between this variable and scores on the dependent variable, post-transfer time to proficiency.

² Participating organizations paid a standard fee per employee selected to help underwrite the costs of the research.

The data reported here were gathered via a 17-page survey questionnaire designed to address widely varied issues related to the effects of personnel transfers on employees' development. Pinder and Walter (1984) described the conceptual rationale for the overall study. We mailed questionnaires to employees along with a letter from the first author, a letter from a senior personnel executive in their company, and a stamped envelope addressed directly to the first author. The purpose of the letters was to introduce the project, to indicate company support for it, and to emphasize that participation was voluntary and confidential. We mailed follow-up letters approximately two weeks after sending the questionnaires.

Measures

The dependent variable, perceived post-transfer time to proficiency, was operationally defined as the unit-weighted sum of four items that were standardized using the overall means and standard deviations for the sample ($\alpha = .70$). Standard scores for the first two items were reversed so that a high score on the composite index indicated relatively short self-reported time to proficiency. Details on this measure and on other measures relevant to the present study appear in the Appendix.

Two objective job differences—whether an employee's last transfer was a promotion and whether it entailed a change in function—were scored on a yes/no basis. Three single-item scales assessed perceived differences between former and new jobs in difficulty, complexity, and similarity.

We constructed five scales to assess perceived support in terms of role clarity ($\alpha = .74$), supervisory support ($\alpha = .85$), co-workers' support ($\alpha = .77$), time pressure to adjust ($\alpha = .48$), and cooperation ($\alpha = .71$). Perceived increases in skills required for performing a new job were assessed by asking respondents to indicate which of their two jobs demanded a higher level of each of 28 skills. We operationally defined this variable as the total number of skill requirements that were seen as more demanding in a new job; respondents could also indicate that the two jobs were about equal on any particular requirement. Finally, two items assessed previous transfer experience. We asked respondents to indicate the number of previous transfers they had had with their current employers and the total number of transfers they had experienced during their careers. Because responses to these two items were highly correlated ($r = .93$), we used the number of transfers with the present employer as our only indicator of this variable.

RESULTS

Table 1 provides the means, standard deviations, and correlations among all variables of concern. Of major interest are the correlations between perceived post-transfer time to proficiency and its hypothesized correlates. The highest correlates of this variable were the measures of perceived differences between jobs and perceived support in a new job setting. Change in function was significantly related to perceived time to proficiency, but increase in rank was not, nor was experience with transfers.

TABLE 1
Means, Standard Deviations, and Correlations Among All Variables

Variables ^a	Means	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
1. Time to proficiency	0.12	2.84												
2. Promotion	1.36	0.48	08											
3. Change in function	1.28	0.45	-13*	07										
4. Job difficulty	4.52	1.31	-30***	-20***	-09*									
5. Job complexity	4.73	1.41	-20***	-24***	-06	59***								
6. Job similarity	3.93	1.81	21***	12*	-35***	-04	-15**							
7. Skill requirements	13.78	6.80	-08	-35***	-09	46***	51***	-17**						
8. Role clarity	18.56	4.05	27***	-13**	-07	01	07	07	08					
9. Cooperation	11.55	2.17	36***	-05	-14**	-10*	01	11*	03	48***				
10. Time pressure	7.34	2.20	17*	-02	-05	-18***	-14**	05	-13**	28***	24***			
11. Supervisory support	18.38	4.77	23***	-07	01	04	09*	-04	05	59***	45***	23***		
12. Co-workers' support	18.58	3.70	31***	02	-07	-13**	-07	05	-04	38***	61***	22***	40***	
13. Number of transfers	3.21	2.37	09	-02	-03	01	-01	15**	-07	05	14**	18***	11*	13**

^a For perceived time to proficiency, high score = quick adjustment; for promotion, low score = transfer was a promotion; for change in function, high score = different department after transfer; and for time pressure, high score = little pressure.

* = $p < .05$

** = $p < .01$

*** = $p < .001$

TABLE 2
Results of Multiple Regression
Predicting Time to Proficiency on a New Job^a

Independent Variables	Betas	Values for <i>t</i>
Promotion	.05	0.94
Change in function	-.06	-1.09
Job difficulty	-.30	-4.22**
Job complexity	-.07	-0.96
Job similarity	.15	2.50*
Skill requirements	.12	1.74
Role clarity	.08	1.11
Cooperation	.17	2.29*
Time pressure	-.05	-0.78
Supervisory support	.12	1.68
Co-workers' support	.08	1.07
Number of transfers	.05	0.94

^a $R = .51$; $F_{12,265} = 7.71$ $p < .001$.

* $p < .05$

** $p < .001$

TABLE 3
Hierarchical Regression Analysis Predicting
Time to Proficiency Using Four Groups of Variables

Independent Variables	R^2	F	p	ΔR^2	F	p
Perceived support	.13	8.95	<.0001			
Perceived differences in jobs	.23	10.00	<.0001	.10	9.87	<.0001
Objective differences in jobs	.23	8.33	<.0001	.00	0.84	n.s.
Number of previous transfers	.23	7.71	<.0001	.00	0.89	n.s.

Regression analyses provided further support for these findings. First, we performed a simple linear regression using all independent variables separately and time to proficiency as the dependent variable; Table 2 presents the results of this analysis. Next, we conducted a four-step hierarchical analysis for predicting perceived time to proficiency in which measures were entered in this order: perceived support (five variables), perceived job differences (four variables), objective job differences (two variables), and number of previous transfers (one variable). Table 3 presents the results of this analysis; the change in R^2 of .10 that we obtained when adding the perceived job differences measures to the perceived support variables was the only significant such change ($F_{4,268} = 9.87$, $p < .001$). These findings suggest that objective differences between jobs and number of previous transfers do not

account for much of the variability in time to proficiency over and above that accounted for by perceived job differences and perceived support in a new work setting. Changing the order of the variables' entry into the regression equation did not affect this interpretation. When we deleted the four groups of variables from the full model individually, the only ones that resulted in significant changes in R^2 were perceived support ($\Delta R^2 = .11$, $F_{5,265} = 7.97$, $p < .001$) and perceived job differences ($\Delta R^2 = .10$, $F_{4,265} = 8.73$, $p < .001$).

Inspection of the beta weights in Table 2 reveals that the two most significant variables for predicting perceived time to proficiency are (1) how much more difficult the post-transfer job was than the job before the last transfer, and (2) how similar the pre- and post-transfer work was. These two variables did not intercorrelate significantly ($r = .03$), which led us to suspect that employees performing new jobs that were both more difficult than and different from their old jobs would have the longest self-reported times to proficiency. To test this hypothesis, we used a median-split procedure to classify employees into four groups: (1) below the median on difficulty and below the median on difference in work (the new work was not much more difficult and was quite similar to the work before the transfer), (2) below the median on difficulty and above the median on difference, (3) above the median on difficulty and below the median on difference, and (4) above the median on both variables. Table 4 shows the group means and standard deviations created by this procedure. A one-way analysis of variance revealed a significant difference among the four groups ($F_{3,307} = 14.51$, $p < .001$), and Newman-Keuls post hoc comparisons revealed that all groups differed significantly ($p < .05$) with the exception of group 1 and group 2. Ranging from longest to shortest time to proficiency, the groups were ordered as follows: group 4, group 3, group 2, and group 1.

TABLE 4
Means and Standard Deviations of Standardized
Scale Scores Representing Time to Proficiency for Four Groups^a

Groups	Means	Standard Deviations	n
High perceived differences and high perceived increase in job difficulty (group 4)	-1.20	3.01	96
High perceived differences and low perceived increase in job difficulty (group 2)	0.86	2.15	84
Low perceived differences and high perceived increase in job difficulty (group 3)	-0.05	2.99	62
Low perceived differences and low perceived increase in job difficulty (group 1)	1.29	2.42	69

^a High scores indicate short adjustment time; $F_{3,307} = 14.51$, $p < .001$.

A fourth analysis involved predicting perceived time to proficiency using the five scales measuring perceived support in the new job setting separately for each of the four groups created by the median-split procedure. Relative difficulty of the new job compared to that of the old job seemed to be most important in moderating this relationship. We found that the support scales did not explain significant variance in either the low difficulty/low similarity group ($R = .36$, $F_{5,56} = 1.66$, n.s.) or the low difficulty/high similarity group ($R = .33$, $F_{5,68} = 1.64$, n.s.). By contrast, collectively the support scales were significant predictors of perceived time to proficiency in both the high difficulty/low similarity group ($R = .46$, $F_{5,52} = 2.76$, $p < .05$) and in the high difficulty/high similarity group ($R = .53$, $F_{5,84} = 6.48$, $p < .001$). Chow tests (Chow, 1960) of the significance of the differences among the regression equations estimated in the four groups confirmed that overall patterns of relationships between support factors and time to proficiency differed among the groups ($F_{18,260} = 3.21$, $p < .01$). Together, these findings suggest that perceived support is more strongly related to time to proficiency when employees perceived new jobs as more difficult than their former jobs.

As was stated, a secondary purpose of this study was to reexamine the hypothesis that employees who have been transferred frequently take progressively less time to become proficient at their jobs following each transfer. As noted in Table 1, the zero-order correlation between number of previous transfers and perceived time to proficiency following the most recent transfer was not significant. This null result confirms that found in the earlier study by Pinder and Das (1979) and reinforces the conclusion that employees do not seem to be able to adjust to new jobs more quickly or more easily following transfers as they experience more and more transfers.

In an attempt to determine whether this conclusion is subject to individual differences, we used Ghiselli's (1956) prediction of predictability technique. After standardizing scores on the time-to-proficiency scale and self-reports of number of previous transfers using sample means and standard deviations, we correlated the absolute difference between these two standardized scores with each of the individual difference variables that were assessed in other parts of the questionnaire:

- (1) whether an employee had requested the most recent transfer,
- (2) length of time spent at the former location before the most recent transfer,
- (3) length of time at the last job at the former location,
- (4) whether the employee had ever worked for the company at the new location at any time in the past,
- (5) whether the person believed the most recent transfer to have been a promotion,
- (6) whether the person had lived in the new location previously,
- (7) age and education level when last transferred,
- (8) amount of raise in pay received with the transfer,
- (9) tenure with the company, and
- (10) number of years of experience in the person's occupation.

Only the last of these variables had a correlation with the unpredictability index that was higher than $\pm .10$ ($r = -.17, p < .02$). In other words, the longer a person had been in a field or occupational group, the stronger was the correlation between perceived time to proficiency and the number of previous transfers the person had experienced. Otherwise, we were unable to find any individual differences to moderate the null relationship between previous transfer experience and the time it took the respondents in this study to become proficient at their new jobs.

DISCUSSION

A number of features of the design of the present study should be acknowledged and addressed before discussing its results. First, the sample included only individuals who had adjusted well enough to remain employed by their organizations after their most recent transfers and excluded those who had left for any reason after a transfer. Doubtless some transferees quit or were released because of the difficulties they had becoming proficient at their new jobs; this likelihood somewhat constrained the sample and the generalizability of results. Second, we gathered cross-sectional data assessing the independent and the dependent variables simultaneously, using self-reports by respondents. Such a design leaves open the possibility that the observed relationships were the result of method covariation, retrospective rationality, or both.

To minimize the possible effects of method covariation, we used a variety of response formats in measuring all variables. The scale for time to proficiency was a blend of two semantic differential items and two ratio-level items that asked about the number of months it took employees to become proficient at their new jobs. The response formats for the independent variables included a three-way checklist for assessing skill requirements, semantic differential scales for the other three items relating to perceived job differences, and Likert-style scales for the perceived support items. A relatively objective item—respondents' reports of actual numbers—assessed previous transfer experience. In addition to using various response formats, we placed items relating to different variables in separate parts of the questionnaire. For instance, several pages separated the items used to measure perceived support from the items measuring the other independent variables and the dependent variable. We are confident that the use of mixed response formats, partial reliance on objective items, and careful separation of items combined to minimize the influence of response set and other method covariation effects that can influence results based on self-reports.

If retrospective rationality was responsible for the results of this study, we would expect to find certain features in the data, such as: (1) a significant relationship between the dependent variable and the time since the transfers occurred, (2) different patterns of correlations between the dependent variable and the independent variables for employees who had requested their most recent transfers and those who had not, and (3) different predictor-

criterion patterns between those who had been promoted and those who had not been promoted. We investigated each of these three possibilities. The correlation between perceived time to proficiency and the length of time since the employees' most recent transfers was .07 (n.s.). We used Chow tests to compare the regression equations for those who had requested transfers and those who had not, as well as for the promoted versus the nonpromoted groups. The *F*s for both Chow tests were less than 1.0, suggesting that retrospective rationality cannot explain the results of the study.

Subject to these considerations, the results indicate that the levels of perceived support a transferee receives after a transfer and the degrees of perceived differences between new and old jobs were the two most important predictors of the self-reported amount of time it takes a transferee to become proficient at a new job. Once these two categories of variables are taken into account, neither objective changes in function or hierarchical level nor the number of an employee's previous transfers explained further variance in the dependent variable.

The group of variables assessing perceived support was the most important predictor of perceived time to proficiency following a transfer. This interpretation was derived from both stepped-up and stepped-down hierarchical regression analyses. However, further analyses revealed that the measures of perceived differences between the new and old jobs moderated the relationship between support and perceived time to proficiency, although that relationship was highly significant in the entire sample. The most significant moderators were differences between the new and old jobs in perceived difficulty and perceived similarity. Regression analyses revealed that perceived difficulty was primarily responsible for moderating the relationship between time to proficiency and levels of support. When perceived difference in difficulty between the two jobs was large, levels of support were positively related to perceived time to proficiency. By contrast, perceived support was not significantly related to time to proficiency when the difference in difficulty was perceived to be small. These findings make intuitive sense and add yet more evidence of the importance of tasks and task design to organizational behavior. Moreover, the fact that our subjective task variables were of predictive value and our two objective indicators were not lends some degree of support to subjective models like the Job Characteristics Approach (Hackman & Oldham, 1980) and little to more objective formulations (e.g., Schwab & Cummings, 1976). Our data also provide some degree of support for the path-goal theory of leadership (House & Mitchell, 1974), which suggests that supportive leadership predicts performance only if the path to a particular goal is ambiguous and not well understood. If one assumes that employees are clear about what is required of them when they perceive few differences in difficulty between their old and new jobs, the relationships between levels of support and perceived time to proficiency are not surprising.

Learning to Transfer Efficiently

Contrary to the rational arguments advanced by Jones (1983), Louis (1980), and Nicholson (1984), no support emerged for the hypothesis that post-transfer time to proficiency is negatively related to the number of previous transfers an employee has experienced.

It is always risky to interpret the practical and phenomenological significance of null results because sampling error, lack of statistical power, or distributional properties of the data may all be responsible for hiding what is in fact a Type II error. Ultimately, those same risks exist in the interpretation of this study's failure to find an inverse relationship between time to proficiency and frequency of previous transfers. For this reason, we considered the possibility that sampling error, lack of power, or distributional characteristics were operative here.

The null result is entirely consistent with results found five years earlier among a different sample of employees (Pinder & Das, 1979), and it is based on a total of almost 800 individuals from a wide variety of industries. Those two facts suggest that the zero correlation results from neither sampling bias nor lack of statistical power. Ex post facto, we examined the possibility that the zero correlation was the result of restricted variance in the number of previous transfers experienced by our respondents. The range on this variable was from a low of 1 transfer to a high of 16 ($\bar{x} = 3.21$, $s.d. = 2.37$). To test whether this distribution was skewed badly enough to account for the zero correlation, we performed a one-way analysis of variance on scores for mean time to proficiency for respondents who had previously experienced 1, 2, 3, 4, 5, 6, or more than 6 transfers. The resultant $F(1.21, df = 6, 305)$ was not significant, and a Student-Newman-Keuls range test (Winer, 1971) failed to find significant ($p < .05$) differences between the means of any two groups. Thus, we can be reasonably sure that the failure to find a relationship between perceived time to proficiency and number of previous transfers is not merely artifactual.

CONCLUSIONS

Taken together, our results indicate that time to proficiency following a transfer may be a function of a variety of events that are transfer-specific—not readily generalized from one transfer to another—so that experience gained from previous transfers is not likely to help an individual adjust quickly to subsequent transfers. These results are inconsistent with theoretical arguments advanced by Louis (1980), Nicholson (1984), and Jones (1983), all of whom reasoned that learning from one career transition is instrumental to adjustment following subsequent transitions. Instead, our data suggest that the more a new job seems different from and more difficult than a former job, the longer it takes for an employee to become proficient following a transfer. The present data also suggest that the levels of support an individual receives from peers and superiors at a new setting are also important, offsetting the effects of perceived differences between jobs and perceived increments

in job difficulty. These results suggest that managements may be well advised to implement policies and practices that provide support and encouragement to transferees, both on the job and off, particularly in the case of transfers that entail significant changes in employees' work or increments in job difficulty. On-the-job support mechanisms might include thorough orientation and public recognition of the status and accomplishments of a newcomer (Goode, 1978). Although off-the-job support services such as providing information to employees about their new communities (Levenson & Hollman, 1980), career assistance for spouses (Cardwell, 1980), and case managers who oversee entire relocations (Levenson & Hollman) may not directly assist employees' adjustments to new jobs, they can reduce the net level of uncertainty they experience in new job settings. Further research is needed to investigate the roles of such organizational policies and managerial practices. Research questions include whether they indeed provide the support that is needed to make career transitions like transfers both humane and effective, how they do so, and the degree to which they succeed.

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APPENDIX

Post-transfer time to proficiency was assessed with four self-report items:

How many months did it take you to become effective at your new job following your last transfer?

How many months did it take you to get to know your way around the informal networks at your new job?

How quickly do you feel you became proficient at your new job following your last transfer? 7 = very quickly, 1 = very slowly.

Overall, how quickly did you start to feel comfortable in your new work setting following your last transfer? 7 = very quickly, 1 = very slowly.

Change in status was assessed by the question, "Did your last transfer *officially* mean a promotion or demotion for you?" Respondents could indicate that it was a promotion, a demotion, neither, or they were uncertain.

To determine whether the last transfer involved a change in function, respondents were asked to answer two questions:

"Please indicate with a check mark the type of department you worked in *before* your last transfer." Alternatives were marketing, sales/leasing, finance, accounting, purchasing, personnel, information/systems, industrial relations, transportation, data processing, customer service, engineering, general administration, building/physical plant, real estate, law/legal, actuarial, production/manufacturing, medical, or other (please specify).

"Now, use the list given in the last question to identify the type of department that best describes the department into which you moved with your last transfer." Discrepancy between the two answers indicated a change in function.

Three items assessed perceived job differences:

"How difficult was your post-transfer job compared to the job you held before your last transfer? (Consider the difficulty level of your new job when you first moved into it.)" 1 = new job much less difficult, 7 = new job much more difficult.

"Overall, how complex was your new job (immediately following your last transfer) compared to your former job?" 1 = new job much less complex, 7 = new job much more complex.

"Overall, how similar was the actual work you performed following your last transfer compared to the work you performed before it?" 1 = completely different, 7 = completely identical.

Items assessing role clarity (RC), supervisory support (SS), co-workers' support (CS), time pressure (TP), and cooperation (C) began with the stem "Following my most recent transfer . . ." and were scored 5 = strongly agree, 1 = strongly disagree; items marked with R were reverse-scored.

My job was clearly explained to me (RC).

I was not sure how my work fit in with the work of others (RC, R).

I understood why I had been transferred (RC).

My job requirements were quite ambiguous (RC, R).

My role in the organization was well explained when I first arrived at my new location (RC).

My immediate supervisor went out of his/her way to do things to make my work life easier for me (SS).

It was difficult to talk with my immediate supervisor (SS, R).

My immediate supervisor could be relied upon to help when things got tough at work (SS).

My immediate supervisor was slow to accept me (SS, R).

My immediate supervisor was willing to listen to my personal problems (SS).

My co-workers went out of their way to do things to make my work life easier for me (CS).

It was difficult to talk with my co-workers (CS, R).

My co-workers could be relied upon to help when things got tough at work (CS).

My co-workers were slow to accept me (CS, R).

My co-workers were willing to listen to my personal problems (CS).

I could have used a bit more time to get "settled" into my new job before I was fully responsible for it (TP, R).

I wish I had been given more notice of my last transfer before I had to move (TP, R).

People were cooperative with what I wanted to do (C).

People listened to my ideas when I first arrived on my new job (C).

I felt that people respected my judgment (C).

Perceived increase in skill requirements was assessed by the question, "Which job was more demanding in terms of the following requirements: public speaking, verbal, writing, abstract reasoning, creative, independent decision-making, information processing, legal, numerical, technical, coordinating, counseling, diplomacy and tact, group decision-making, interpersonal, liaison, mediation/peace-making, negotiation, political, budgetary, long-range planning, resource acquisition, resource allocation, short-range planning, work assignment, manual, physical strength, physical stamina."

Previous transfer experience was assessed with the item, "How many times have you been transferred by your present employer?"

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EFFECTS OF PRIOR EXPECTATIONS ON PERFORMANCE RATINGS: A LONGITUDINAL STUDY

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Several theories predict that supervisors' expectations about subordinates' performance may bias their subsequent evaluations of those subordinates. Data from 49 supervisor-subordinate dyads were collected within a longitudinal design. Results suggest that prior expectations interact with actual performance to affect ratings, implying that supervisors respond negatively to disconfirmation of expectations. No support for the notion that an attributional mechanism can explain this reaction to disconfirmation emerged. These findings suggest that certain affective components of appraisal may be important for understanding bias.

Attempts to maximize the accuracy of formal supervisory ratings in organizations by identifying or eliminating sources of bias have consumed an impressive amount of time and energy. Although investigators have studied many sources of bias in ratings in organizational settings,¹ they have tended to focus on raters as faulty but motivationally neutral elements in the rating process (Denisi, Cafferty, & Meglino, 1984). It is clear that raters are not perfectly capable of rating performance accurately. In addition, they may also be unwilling to do so for individual, social, or organizational reasons (Banks & Murphy, 1985; Tsui & Barry, 1986). Motivational factors such as cognitive consistency, ego enhancement, commitment, organizational rewards, and social pressures may contribute to bias, but they have received relatively little attention.

This article reports a study of one such motivational influence on ratings—the potential effect of a rater's prior expectations about a ratee's performance on later ratings of that performance. Few field studies have investigated this possible bias, although several social and cognitive psychological theories suggest that some type of expectation effect may be important for understanding ratings (Ilgen & Favero, 1985). Only one study (Bazerman, Beekun, & Schoorman, 1981) has demonstrated a relationship between the promotion of a subordinate, which those authors viewed as a form of prior expectation by one or more supervisors, and later performance ratings.

I would like to thank Charles O'Reilly, Ray Zammuto, Greg Northcroft, and the anonymous reviewers for their helpful comments on drafts of this paper.

¹See Landy and Farr (1980) for a review.

Four theories posit various motivations and mechanisms underlying possible relationships between expectations and ratings: information processing, hedonic relevance, attribution, and avoidance of negative feedback. For the most part their hypotheses are compatible. This study sought to ascertain whether actual relationships between expectations and ratings approximated the predictions based on any of the four theories. Such information would allow future researchers and practitioners to focus on variables of likely importance.

Some discussion of the nature and assessment of bias should precede description of the four theories and their predictions. In practical terms, correlations between measures of actual performance and performance ratings represent the accuracy of those ratings. Less than perfect correlations reflect bias, imperfect or incomplete measurement of actual performance, or both. If the degree of correlation between measures of actual performance and ratings can be interpreted as the ratings' degree of accuracy, the complement to this correlation reflects potential bias. Therefore, to ascertain the existence and amount of bias in a rating, it is necessary to control for the accurate, nonbiased portion. This can be accomplished statistically by including a measure of actual performance that is obtained independently of a rater's evaluation of that performance as a control variable in an appropriate procedure.

Numerous theories describe potential biases in ratings (Landy & Farr, 1980), and much research has attempted to explain such bias. However, those investigations have rarely predicted variance in ratings above and beyond their veridical component. Consequently, it is impossible to know if their findings reflect the operation of erroneous or accurate rating processes.

Social and cognitive psychological theories that suggest expectations affect ratings differ in their assumptions about raters' motivations as well as in the exact mechanisms that they propose.² They are not directly competitive, however, because they focus on different dependent variables and predictions.

The Information Processing Perspective

Research grounded in cognitive information processing theory has suggested several mechanisms by which raters arrive at ratings. Raters may overweight negative information in order to reduce uncertainty (Hamilton & Huffman, 1971); to the degree that available information is negative, this would cause ratings to be lower than warranted. Alternatively, raters may seek out diagnostic information, which should lead to accurate ratings (Trope

²The relationship between expectations and ratings is potentially reciprocal. Rosenthal and Jacobson's (1968) study of self-fulfilling prophecy described the effects of prior ratings on subordinates' performance and raters' evaluations, and Staw (1976) described the escalation of commitment that may result from previous decisions. Given the lack of extensive research on a model in which variables are reciprocally related and the exploratory nature of this study, I limited investigation to causality from expectation to later ratings, leaving the problem of investigating the more complex model to future research.

& Bassok, 1982). These possibilities are not germane to this study, however, as they operate independently of expectations.

Other cognitive information processing research suggests that prior expectations are directly involved in the rating process. Individuals prefer to search for, perceive, and recall information consistent with their prior expectations rather than information that is inconsistent with those expectations (e.g., Ajzen, Dalto, & Blyth, 1979; Lord, Ross, & Lepper, 1979; Rothbart, Evans, & Fulero, 1979); they also perceive and recall ambiguous information as more consistent with expectations than it is objectively (Hastie, 1981).

Hypothesis 1: With subordinates' actual performance controlled, the higher supervisors' prior expectations are, the better will be the performance ratings they give.

Figure 1a shows this hypothesis graphically. Rosenthal and Jacobson's (1968) ideas about self-fulfilling prophecy also provide a basis for Hypothesis 1. They suggested that expectations affect supervisors' treatment of subordinates, which influences actual performance, which in turn influences performance ratings.

The Hedonic Relevance Perspective

Hedonic relevance theory (Carlsmith & Aronson, 1963) suggests that disconfirmation—a mismatch between a prior expectation and later perceptions of actual performance—affects evaluations. According to this theory, individuals are averse to being wrong and respond emotionally to disconfirmation by punishing its source, whether the surprise is pleasant or unpleasant (Oliver, 1976). In the context of supervisory ratings, prior expectations could interact with actual performance to lower ratings.

Hypothesis 2: With subordinates' actual performance controlled, inconsistency between raters' prior expectations and subordinates' actual performance diminishes ratings.

Figure 1b depicts this hypothesis.

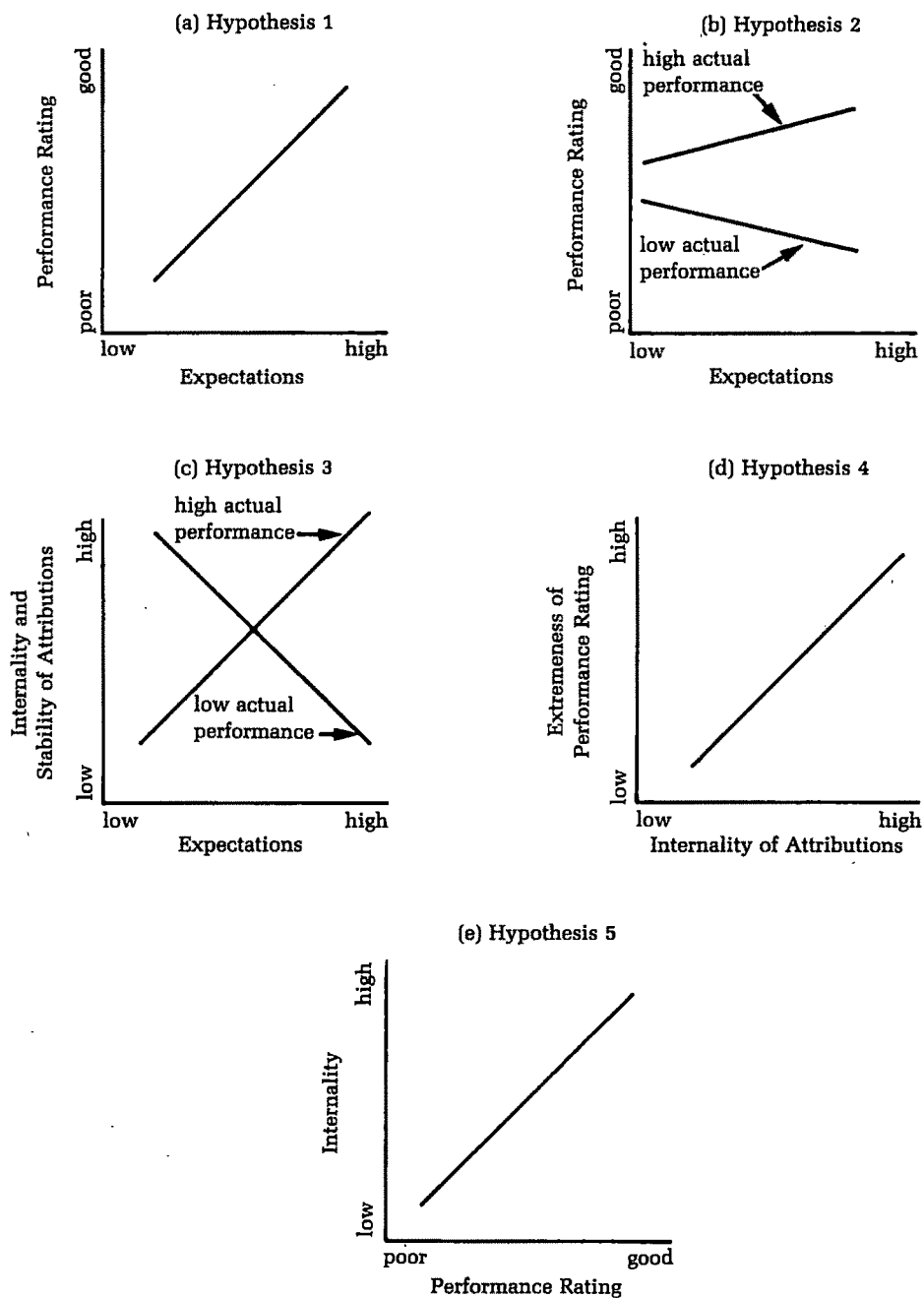
The Attribution Perspective

Attribution theory proposes that attributions act as a mediating mechanism between expectations, observations, and subsequent evaluations (Feldman, 1981; Green & Mitchell, 1979; Louis, 1980; Mitchell, 1982; Mitchell & Kalb, 1981, 1982; Mitchell & Wood, 1980). The model implies two stages, each of which generates a hypothesis. First, disconfirmation of a prior expectation by subsequent observations triggers individuals' needs to explain causation, and they attribute the disconfirming events to unstable (Tucker & Rowe, 1979) or external (Crocker, Hannah, & Weber, 1983) causes.

Hypothesis 3: Supervisors will be more likely to attribute causality for subordinates' performance to external and unstable causes when that performance disconfirms their prior expectations than when performance confirms those expectations.

Figure 1c depicts this hypothesis.

FIGURE 1
Graphic Representations of Hypotheses



Second, evaluators' attributions of causality affect subsequent ratings, because those ratings in part reflect their judgments as to ratees' responsibility for causing the performance. Generally, people hold others to be more responsible for events that appear to have internal causes and hence to be under their control than for events having apparently external causes. When performance is good, attribution to internal causes enhances ratings because individuals receive credit for their performance. When performance is poor, attribution to internal causes depresses ratings because individuals receive blame for the poor results. Thus, attributions interact with actual levels of performance to affect ratings (Ilgen, Mitchell, & Fredrickson, 1981; Knowlton & Mitchell, 1980; Mitchell & Wood, 1980; Wood & Mitchell, 1981), and attributions of high levels of responsibility increase the extremeness of both positive and negative performance ratings.

Hypothesis 4: Attributions for subordinates' performance to internal causes will be associated with extreme subsequent performance ratings, both high and low.

Figure 1d depicts this hypothesis.

Although no research has tested this two-stage model comprehensively, studies concerning each stage have appeared. Their settings were not organizational, however, and they reported that both internal and external attributions accounted for less variance than had been expected, although the variance accounted for was significant (Mitchell, 1982).

The Avoidance of Negative Feedback Perspective

Ilgen and colleagues (1981) and Fisher (1979) suggested that attributions follow, rather than precede, evaluations. Raters first form conclusions about the quality or quantity of a ratee's performance and arrive at a rating. However, individuals dislike giving others negative feedback and want to avoid their potential adverse reactions. Therefore, they use external attributions to explain away any negative ratings they give. In the context of supervisory ratings, the worse the performance rating, the more supervisors attribute causality to factors external to subordinates. This allows subordinates to maintain their self-images and allows supervisors to minimize interpersonal conflict. This perspective predicts, then, a positive correlation between ratings and attributions to internal causes.

Hypothesis 5: The higher the ratings supervisors give, the more they will attribute performance to internal causes.

Figure 1e depicts Hypothesis 5.

METHODS

Overview of the Research Design

This study attempted to test whether predictions based on the four theoretical perspectives were borne out in a field setting. I gathered data on 49 rater-ratee dyads via two questionnaires that supervisors completed approximately four months apart. The first questionnaire, administered in Novem-

ber and December 1980 and January 1981, asked supervisors to indicate how well they expected particular subordinates to perform in the future. The second questionnaire, administered in May 1981, asked them to report the real performance appraisal ratings the subordinates received and to respond to questions assessing the causes of their performance. Archival records provided objective measures of subordinates' performance during the period between administration of the two questionnaires. I tested Hypotheses 1, 2, and 3 within a longitudinal design designating the administration of the first questionnaire as time 1 and administration of the second questionnaire as time 2. Hypotheses 4 and 5 were tested with cross-sectional data.

Population

Respondents were 29 first-level supervisors of tellers employed by a large West Coast bank in one of three regions. I asked them to provide data about their two newest tellers and in addition about any teller who had been employed less than three months at the bank. Data collection focused on relatively new tellers because their ratings were least likely to be contaminated by prior ratings. Supervisors provided information about 49 tellers; their average age was 25.8 years, and 42 of them were women. Their educational levels ranged widely; some had no high school degree and others were college graduates. Their average tenure at the time of the first questionnaire was 81 days, with a range of 8 to 336 days.

There were 29 supervisors, 26 of whom were women, who completed all phases of this study; they represented 65 percent of the initial population. Attrition was due to turnover among tellers, transfers among supervisors, and supervisors' failures to return questionnaires. Respondents' average age was 34.4 years, and they had an average 3.4 years of supervisory experience, 1.3 years in their present positions, and 5.2 years of experience as tellers. Some had no high school degree and others were college graduates.

Measures

Performance ratings. By the time supervisors completed the second questionnaire, most of the tellers had been employed for more than six months and had consequently received their first formal performance review. Thus, to measure performance I used the bank's performance review system, which defined five levels of performance: (1) far exceeded the requirements of the job, (2) consistently exceeded the requirements of the job, (3) consistently met the requirements of the job and may have exceeded them in some, (4) met minimum requirements of the job in most areas, and (5) did not meet the requirements of the job. For tellers who had received a formal review, supervisors were asked to indicate what rating had been assigned for overall performance, cash balancing, and speed. The Appendix presents further details on this measure. I used the mean of these three performance ratings as an index ($\alpha = .84$, $p < .001$), reversing its direction to aid in interpretation; thus, the higher the performance rating, the better the evaluation.

The measure of ratings' extremeness was derived from the index by taking the absolute value of a z-score based on the difference of the mean of each teller's rating index from the overall mean of rating indices for all tellers. Table 1 gives descriptive statistics for this and all other measures.

Expectations. Expectations were defined as supervisors' predictions concerning future performance. Three 5-point scales asked them how well they expected particular subordinates to perform in the future; response possibilities ranged from exceptionally poorly to exceptionally well. I assessed supervisors' expectations separately for cash balancing, speed, and overall performance and constructed an index of overall expectations by taking the mean of the separate expectations ($\alpha = .90$).

Actual performance. The job of bank teller allows objective measurement of actual performance in cash balancing.³ The bank expects all tellers to be able to balance their cash at the end of each working day; failure to do so is recorded and becomes part of their permanent performance records. I obtained actual performance data from branch archival cash-balancing records for each teller in the study but, to aid in interpretation, I reversed the direction of the variable so that a high outcome indicates a good balancing record. Further details appear in the Appendix.

Attributions. Measures of stability and internality of attributions were created through a process described in detail in the Appendix. In brief, 36 items measured supervisors' attributions to 12 possible causes of performance: teller's intelligence, ability to do the job, moods, interest in the job, personality, effort, the easiness or difficulty of the job, actions of other tellers,

TABLE 1
Descriptive Statistics and Correlations Between Variables^a

Variables	Means	Standard Deviations	1	2	3	4	5	6	7
1. Performance rating	3.01	0.57							
2. Extremeness of performance appraisal	0.06	0.95	.01						
3. Expectations	3.79	0.88	.28	.18					
4. Actual performance	-0.04	1.79	.16	-.01	.15				
5. Internality	4.46	3.93	.54	.12	.13	.11			
6. Stability	7.88	2.15	.27	.01	.23	.28	.27		
7. Teller's tenure	81.08	70.17	-.14	-.18	-.29	.23	-.30	.27	
8. Expectations \times actual performance	-0.33	2.15	-.31	-.03	.21	.14	-.16	.24	-.33

^a $n = 49$. Correlation coefficients above .23 are significant at $p < .05$; those above .34, at $p < .01$. Decimal points are omitted.

³The original design of this research also called for collecting performance data on speed. Unfortunately, records of the daily number of transactions were not available for 12 tellers because of an internal audit of randomly selected records. Analyses with the reduced number of cases ($n = 37$) revealed no significant predicted relationships between a teller's speed and any other relevant variables, so I dropped this measure from the final analyses.

supervisory actions, training received, incentives for success or failure, and luck. Supervisors rated each possible cause as to how much it contributed to a given teller's performance in each of three areas—overall performance, cash balancing, and speed—on a 7-point scale ranging from no contribution to a large contribution. I summed items across areas of performance to create indices of attributions to the 12 possible causes and then combined these indices into composite scores for attributions to internal causes and attributions to stable causes (Porac, Ferris, & Fedor, 1983).

Tellers' tenure. Because tenure could explain variance in the other variables, I included it as a control variable in the analyses, measuring it as the number of days between the date a teller was hired and the supervisor's completion of the first questionnaire.

Analysis

Except where another analysis is indicated, I used hierarchical multiple regression to test the hypotheses, because analyses involving control variables or interactive effects require specification of a hierarchy of variables (Cohen & Cohen, 1975). Under such conditions, several types of findings warrant attention: the amount of additional variance explained by adding a variable as predicted by theory, the level of significance of the regression coefficient of that variable, and the level of significance of the results of the overall regression equation.

RESULTS

Table 1 presents zero-order correlations among the variables. Surprisingly, actual performance did not correlate significantly with ratings, which suggested that either the ratings were inaccurate or the measure of actual performance was inadequate. Since that measure came directly from the bank's archival records, the data on actual performance are likely to be accurate, but may not adequately represent comprehensive job performance. Performance ratings did correlate significantly with the magnitude of supervisors' expectations and with internality of attributions. Tenure was negatively and significantly correlated with expectations and internality of attributions but was not significantly correlated with performance ratings or actual performance. The correlations between most variables were not significant.

Hypothesis 1, based on information processing theory, would predict that expectations at time 1 will be positively related to ratings at time 2 when actual performance in the interval between the two is controlled. Results, presented in Table 2, narrowly failed to support Hypothesis 1 at a significance level of $p < .05$ (actual significance level, $p = .07$).

Hypothesis 2, based on the theory of hedonic relevance, would predict an interaction effect between expectations at time 1 and actual performance between time 1 and time 2. To test this hypothesis, I entered the interaction term, the cross-product of the z-scores of the constituent variables, as the

TABLE 2
Results of Regression Analyses^a

Dependent Variables	Hypotheses	Independent Variables					Change in R ^{2b}	Overall F
		Actual Performance	Expectations	Expectations × Actual Performance	Internality	Performance Appraisal		
Performance rating	1	.12	.26				.07	2.33
Performance rating	2	.13	.32*	.32*			.12	3.61*
Internality	3	.10	.13	.14			.00	0.59
Stability	3	.27	.20	-.06			.01	1.73
Performance rating extremeness	4	-.04	.21	.19	.08		.01	0.95
Internality	5					.54***	.30	19.80

^a n = 49.

^b Change in R² applies to last variable entered.

*p < .05

**p < .01

***p < .001

final step of a regression.⁴ As Table 2 shows, the coefficient for the interaction term is significant ($p < .05$); it contributes an additional 11 percent of the variance in ratings.

Hypothesis 3, drawn from attribution theory, concerned the relationship between expectations, actual performance, and attributions, predicting an interactive effect on attributions at time 2 between expectations at time 1 and actual performance between times 1 and 2. Results imply no support for the idea that disconfirmation of expectations enhances attribution to external or unstable factors.

Hypothesis 4, also based on attribution theory, concerned the relationship of internal attributions to the extremeness of ratings. Because this hypothesis was tested with cross-sectional data, no causal inferences can be made. However, since the hypotheses predict different correlational patterns, relationships between variables can be examined for consistency with predictions. Results did not support the prediction, made in Hypothesis 4, of a positive correlation between internal attributions and extremeness of ratings.

Hypothesis 5, based on a theory postulating avoidance of negative feedback, suggested that ratings are positively related to internal attributions. Bivariate regression results indicated support for the hypothesis.

Finally, I conducted separate regression analyses with tenure entered on the first step. That variable entered significantly into regressions on attributions to internal causes ($\beta = .54, p < .01$); however, the pattern of relationships among expectations, actual performance, the interaction term, and the dependent variable was the same as when tenure was not entered. In the rest of the regressions, tenure did not achieve significance ($\beta = .00-.20$).

DISCUSSION

In summary, the results indicate support for only two of the five hypotheses. Hedonic relevance theory, which suggested that disconfirmation of expectations lowers ratings, achieved strong support, as did theory concerning avoidance of negative feedback. Results supporting the information processing hypothesis failed to achieve significance by a narrow margin, and the two hypotheses suggested by attribution theory received no support.

The results reported here suggest first that expectations—and particularly, their disconfirmation—appear to be important in explaining performance ratings. When a subordinate's actual performance disappoints a rater's expectations about that performance, subsequent ratings will be lower than

⁴A linear transformation performed with the constituents of an interaction term does not affect regression results (Cohen, 1978) but does provide two benefits. First, it reduces the potential for multicollinearity. Second, the cross-product of the scores of expectations and actual outcomes can be interpreted directly as the degree of confirmation of previous expectations by actual performance. Such interpretation is possible because the multiplication maps both confirming pairs (high expectations/good outcomes and low expectations/poor outcomes) into the same positive space and both disconfirming pairs (low expectations/good outcomes and high expectations/poor outcomes) into a different and negative set of values.

actual performance warrants; when actual performance exceeds a rater's expectations about that performance, subsequent ratings will again be lower than actual performance warrants. This is consistent with hedonic relevance theory, but not with Hastie's (1981) suggestion that inconsistent information is overweighted in ratings; that theory would predict that when inconsistent, positive, actual performance surprises an evaluator with low expectations, ratings will show upward bias. Instead, results of the present study show downward bias with both positive and negative surprises. Hedonic relevance theory suggests the reasons for this relationship are affective: raters react affectively to surprises and punish the source of their disconfirmation.

Second, the findings establish a connection between ratings and attributions to internal causes, supporting the idea that attributions play an important role in maintaining smooth interpersonal relations (Ilgen et al., 1981; Fisher, 1979). Interestingly, this reasoning complements that of hedonic relevance theory; both suggest that evaluators perceive their worlds accurately but bias ratings because they wish to avoid unpleasantness. These findings also complement emerging work on the importance of affect in rating bias (Tsui & Barry, 1986).

Bias in evaluations due to disconfirmation and avoidance is likely to be harmful to the future results raters seek to obtain. First, supervisors are punishing employees who represent good surprises by rating them more negatively than their actual performance warrants. This could lead to dissatisfaction, turnover, and absenteeism among employees, as well as to declines in performance. Second, by avoiding warranted attributions of poor performance to internal causes, supervisors fail to communicate to employees the need to control their own actions and hence impede their ability to correct flaws.

The findings point to an opportunity to understand raters more fully through studying the affective components of the appraisal process in depth. It appears that raters' capability versus their willingness to provide accurate ratings (Banks & Murphy, 1985) is an important issue. Most, though certainly not all, previous research on ratings has treated raters as faulty but motivationally neutral elements of the appraisal process and has concentrated on improving their accuracy by minimizing these faults with improved rating scales, formats, and training. This research suggests that a complementary approach to improving the accuracy of ratings might involve investigating the motivations that may influence that accuracy. Both internal factors like cognitive consistency, ego enhancement, and commitment, and external ones like organizational systems, rewards, and social pressures may be important.

If this reasoning is correct, training programs to improve the accuracy of ratings should either be designed to bring knowledge of these and other nonconscious processes to raters' conscious awareness or should be designed to produce shifts in ratings through countervailing motivational or informational factors. This study also suggests that the more often raters

must use objective measures like rating formats or strict procedures, the more likely ratings are to be accurate.

Clearly, the small number of cases involved in this research and its restriction to one type of rater limit its generalizability. Future research, therefore, should include a replication of the study with a larger data base and other types of respondents. However, the availability of objective performance data in this study's setting was a major advantage. Replication in other organizational settings will require that at least some objective measure of performance be available.

Two other considerations suggest caution about these findings. First, since some supervisors in our study were part of more than one dyad, their responses about different subordinates may not be independent. Second, since the outcome measure did not correlate highly with ratings, its validity as a measure of performance could be questioned. The low correlation may be due to the limited scope of the measure; it represents only one aspect of a teller's job, cash-balancing performance. However, other explanations for this low correlation are more likely. First, this organization did not have explicit standards about how many outages constituted good or poor performance. Indeed, informal *ex post facto* conversations with respondents revealed that supervisors' individual standards varied considerably from office to office. Under such circumstances, a low correlation between appraisals and actual performance is not surprising. Since disconfirmation reflects the personal standard inherent in the expectation measure, the disconfirmation effect should also not be surprising.

Second, the objective measure represents only one dimension of a multi-dimensional job; correlations may be low because evaluations of other aspects of performance may overwhelm the evaluation of cash-balancing performance. However, two groups of supervisors—nonrespondents whom I questioned before the study and respondents whom I questioned after it—indicated that cash balancing was the single most important part of tellers' jobs. It may be that disconfirmation of a prior expectation in a single important area of performance can affect ratings significantly, negatively, and to a degree that is disproportionate to the area's apparent importance.

In any case, the emergence of a predicted, statistically significant interaction with use of the measure implies that a powerful underlying process is being uncovered. The findings of this study suggest that our understanding of ratings can be improved by considering not only cognitive processes, but also affective, motivational dynamics. Such consideration would complement an emerging recognition of the effects of organizational, social, and individual factors on performance appraisal (cf. Zammuto, London, & Rowland, 1982). This study has shown that such an approach to investigating performance appraisal can yield insights on the rating process, on improving the accuracy of ratings, and even on structuring appraisal systems that will be more effective than those presently in use.

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APPENDIX

Performance rating. When tellers had not received a formal performance review, as was the case with 19 tellers who had less than six months tenure at time 2, the questionnaire asked supervisors to indicate the level of performance that a teller would receive if the performance review were to be done at that time. No significant differences between tellers rated this way and those receiving formal ratings appeared for any relevant variables. Therefore, I used performance levels assigned by both methods.

Actual performance. Two types of data were used. First, I randomly selected a Monday, a Tuesday, a Wednesday, a Thursday, and a Friday between administration of the first questionnaire and April 1, 1981 and recorded for all tellers the number of those days on which an outage occurred. I selected the number of outages rather than their dollar amounts because the supervisors whom I interviewed during the design phase of the study indicated that they considered number of outages to be the most important measure of balancing performance. They stated that this was because the number of errors, not their amounts, determines the difficulty of finding

and correcting an outage. Further, although more errors might mean more money over or under, it is just as likely that errors will cancel each other out; therefore, the meaning of a total dollar outage is not clear.

Second, I obtained the number of days each teller was out of balance during the entire month of April 1981, a typical month that also fell between the two questionnaire administrations. Combining measures taken over the length of the study and measures concentrated in one month reflected short- and long-term performance. The number of times out of balance on the five days correlated significantly with the number of times out of balance in April ($r = .55, p < .001$). Nunnally (1967) suggested that for a preliminary study of this nature a coefficient of .50 is sufficient to demonstrate reliability. Therefore, I added the two measures to form an index of overall performance.

Attributions. First, 12 items were developed by modifying Weiner, Freize, Kukla, Reed, Rest, and Rosenbaum's (1971) system of attribution categories through interviews with three supervisors who were not respondents prior to the survey. In the study, supervisors rated how much each factor contributed to each teller's performance in the three performance areas: cash balancing, speed, and overall performance. Attributions in the three areas were closely related ($r = .38-.87$), and I therefore created 12 indices by summing attributions on each factor ($\alpha = .60-.96$).

Second, internality and stability scores were computed, as suggested in previous research (Porac, Ferris, & Fedor, 1983). I calculated an internality score by subtracting the sum of all external attributions (luck, job's easiness or difficulty, actions of other tellers, supervisory actions, training received, and incentives for success or failure) from all internal attributions (teller's intelligence, effort, moods, interest in job, personality, and ability). Similarly, a stability score was calculated by subtracting the sum of all unstable attributions (luck, teller's effort, moods) from the sum of all stable attributions (teller's intelligence, personality, ability, and job's easiness or difficulty). I excluded several attribution factors—actions of other tellers, supervisory actions, teller's interest in the job, training received, and incentives for success or failure—from calculations of the stability scores because of their lack of a priori definition along that dimension.

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RESEARCH NOTES

© Academy of Management Journal
1987, Vol. 30, No. 2, 369-380.

STATISTICAL POWER IN CONTEMPORARY MANAGEMENT RESEARCH

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It is well known that in rejecting a true null hypothesis a researcher commits a Type I error with a risk α , and that when someone sustains a false null the error is of the second kind (Type II) with a risk β . However, because the real state of a given null hypothesis—its trueness or falseness—is unknown, the type of error committed in a given study to which it is relevant also remains unknown. The implication here is that investigators should control both types of error and report their associated risks, both α and β . It follows that they should also consider statistical power, defined as the probability of rejecting a false null hypothesis. However, according to several surveys of the social sciences (e.g., Brewer, 1972; Chase & Chase, 1976), the attention that has been afforded α much outweighs that given to β and to statistical power, and as a result much research has entailed high probabilities of sustaining false null hypotheses. In fact, some authors (Cohen & Cohen, 1983; Hunter, Schmidt, & Jackson, 1982) have suggested that many investigators misunderstand the concept of power.

The purpose of the present study was to revitalize interest in statistical power among management researchers by (1) briefly reviewing the main codeterminants of power, (2) assessing statistical power in a population of management studies, and (3) discussing the meaning and implications of these findings using examples from published research.

CODETERMINANTS OF STATISTICAL POWER

There are three codeterminants of power (cf. Cohen, 1977). The significance criterion (α) is a researcher's long-term probability of erroneously rejecting the null hypothesis. Thus, all else being equal, the larger the α , the higher the power and the more likely a false null will be rejected.

The reliability of sample results may or may not be directly dependent on a unit of measurement, a population value, or the like (cf. Cohen, 1977: 6),

but it is always dependent on the size of a sample (n). Thus, the larger the n , the smaller the error; everything else being equal, the greater the reliability, the higher the probability of rejecting a false null hypothesis. *Effect size* represents the magnitude of a phenomenon in a population. If all else is constant, the larger the effect size, the greater the degree to which a phenomenon manifests itself and the greater the probability it will be detected and the null hypothesis rejected.

The three parameters and statistical power are so closely related that when any three are known, the fourth can be precisely determined. Ideally, a researcher should estimate effect size, decide the levels of α and β (and consequently the level of power) appropriate for a study, and then solve for the necessary n . However, β and power can also be calculated a posteriori as a function of the other three codeterminants. Obviously then, whether a researcher does or does not consider statistical power at any stage of research, results always bear the imprint of its codeterminants.

Because α has been conventionally set at the .05 level, Cohen (1977) estimated that β may be set at .20. He assumed that the risk of failure to find (β) may be about four times less serious than the risk of finding what does not exist (α). Consequently, power ($1-\beta$) is conventionally set at the .80 level. However, because in some situations the risk associated with β may also be extremely costly, the ratio of $\beta:\alpha$ should be sensitive to the relative risk inherent in Type I and Type II errors for every conclusion.

The explosion of the space shuttle *Challenger* is illustrative. The investigatory presidential committee uncovered flaws in the decision making process prior to the accident (McGinley, 1986). Decision makers at the National Aeronautics and Space Administration faced a choice between two types of assumptions, each with a distinctive risk and cost. The first was that the shuttle was unsafe to fly because the performance of the O-ring in the rocket-booster was different from that used on previous missions. The second was that the shuttle was safe to fly because there would be no difference between the performance of the O-rings in this and previous missions. If the mission had been aborted and the O-ring had indeed been functional, Type I error would have been committed. Obviously, the cost of the Type II error, launching with a defective O-ring, was much greater than the cost that would have been incurred with Type I error.

Of the three power codeterminants, effect size is perhaps the most difficult to estimate. Ideally, an investigator can calculate an index for effect size from the proportions of explained variance accounted for in past, well-conceived research. For example, the effect size index for the difference between two means is the standardized difference (d) between them. However, when an area of inquiry is new or it is otherwise not feasible to calculate such an index, it is possible to use one of Cohen's (1977) three conventional levels representing small, medium, and large sizes of a phenomenon in a population. For example, for the d index cited above, the three values are .20, .50, and .80. It should be noted that it is the index for the effect size, d , not the variance, that is designated as small, medium, or large.

The interrelatedness of power's codeterminants provides a logical entrance to assessing the statistical power of management research. Specifically, using its published n and a given α , an analyst can estimate for the three conventional levels of effect size the statistical power of any study. To our knowledge, despite the importance of the issue of statistical power, no other such empirical assessment has been reported for management research. The results should also be of wide interest if indeed "statistical significance is so earnestly sought and devoutly wished for by behavioral scientists" (Cohen, 1977: 1).

ASSESSMENT OF STATISTICAL POWER IN MANAGEMENT RESEARCH

Methods

Previous surveys of statistical power in abnormal and social psychology, education, applied psychology, and marketing have all investigated research in one volume of one journal in the subject discipline. This study included empirical research in the 1984 issues of the *Academy of Management Journal* and the *Journal of Management* and in the 1984 *Proceedings of the Midwest Division of the Academy of Management*; we chose the last to represent published research on a regional level. In keeping with previous practice, studies served as the units of analysis, and we examined only major significance tests for which power tables are available (R^2 , β , F , t , r , χ^2 , and p ; Cohen, 1977, 1983), omitting secondary tests like manipulation checks and peripheral reliability estimates.

For each test of significance, we adopted Cohen's three conventional levels of effect size—small, medium, and large. When cell sizes were unequal, we used harmonized mean functions. Also, when factorial and complex designs of analysis of variance were employed or when interaction was considered, we determined the n for the factors or interactions involved according to Cohen's (1977) formulae. The .05 level of significance was used uniformly, as was the nondirectional version of the null hypothesis.

Once power estimates for all tests in a study had been computed, the study's average statistical power was calculated for small, medium, and large effect sizes. With this conventional procedure, no matter how many tests a particular study involved, all studies counted equally in the analysis. We then distributed the mean values for power at each of the three levels of effect size and determined their central tendency measures. This procedure is consistent with previous surveys of statistical power (Chase & Chase, 1976; Cohen, 1962).

Results

A total of 84 empirical studies containing major significant tests for which power tables exist were analyzed. The *Academy of Management Journal* provided 54, the *Journal of Management*, 9, and the *Proceedings of the Midwest Division of the Academy of Management*, 21. The total number of

tests in the examined articles was 7,215.¹ There were 777 tests of R^2 , 2,707 of β , 701 of F , 372 of t , 2,471 of r , 112 of χ^2 , and 75 of p . Table 1 gives the frequencies of cumulative percentage distributions of statistical power as well as central tendency measures of its means for the three levels of effect size. Given nondirectional statistical tests at the $\alpha = .05$ level, the power needed to detect the three levels of effect size can be described.

Small effect size. The mean of power estimates for this effect category was noticeably small, .31. On the average, the studies reviewed had less than one chance in three of detecting small effects. In fact, examining other central tendency measures presented in Table 1 shows that the presence of several extreme points inflated this mean; 83 percent of the studies examined had a less than 50-50 chance of detecting significant results. Only five studies (6%) realized the conventional 80 percent power level or better. Thus, researchers who investigated small effect sizes assumed an average risk of sustaining false null hypotheses 69 percent of the time.

Medium effect size. When we assumed medium effects—generally about twice as large as the small effects in the populations studied—the average statistical power improved dramatically to .77. Of the studies examined, 85 percent achieved a more than 50-50 chance of correctly rejecting their major null hypotheses, and 56 percent achieved the conventional .80 power level or better.

Large effect size. The improvement in power was quite noticeable here; 86 percent of the studies achieved the .80 level of power or better, and slightly more than half had a 99 percent chance of correctly rejecting the null hypothesis. The mean power of this category shows that, on the average, researchers who investigated large effects assumed only a 9 percent risk of sustaining false null hypotheses.

Table 2 shows an interdisciplinary comparison of power analyses published in several areas of the social sciences. Although some caution should be exercised because of slight differences in analytical techniques across surveys, there is a general superiority in the power of research in management and marketing. For an accurate comparison across disciplines, we should of course have held time constant, for it is possible that over the years any or all of the other disciplines have improved their methodological rigor. However, reports by Brewer (1972) and Chase and Chase (1976) did not differ appreciably from Cohen's (1962). It is also interesting to note that despite the small number of studies from the *Journal of Management*, the

¹ This implies an average of 86 tests per study. Although large, the figure included all r 's reported in correlation matrices preceding regression analysis. The power of all $k(k-1)/2$ coefficients was estimated with only one calculation when n was the same for the whole matrix. Statistical power with and without these r 's was the same for all three levels of effect size. However, we do not consider the correlations to be a small matter, given their importance to their studies and to meta-analysis. It is consistent with our theme to assume that whenever α was important enough to report, as was the case in these correlation matrices, β and $1-\beta$ should also be important enough to report. Such an assumption is also consistent with previous power surveys.

TABLE 1
Frequency and Ascending Cumulative Percentage Distributions
of Statistical Powers^a

Small Effect Size			Medium Effect Size			Large Effect Size		
Power	Frequencies	Ascending Cumulative Percentages	Power	Frequencies	Ascending Cumulative Percentages	Power	Frequencies	Ascending Cumulative Percentages
.99	3	4	.99	24	29	.99	46	55
.95-.98			.95-.98	13	44	.95-.98	9	66
.90-.94	1	5	.90-.94	5	50	.90-.94	8	75
.80-.89	1	6	.80-.89	5	56	.80-.89	9	86
<hr/>								
.70-.79	2	8	.70-.79	8	66	.70-.79	5	92
.60-.69	2	11	.60-.69	5	71	.60-.69	2	94
.50-.59	5	17	.50-.59	11	85	.50-.59	3	97
.40-.49	9	27	.40-.49	5	91	.40-.49	1	99
.30-.39	12	42	.30-.39	2	93	.30-.39		
.20-.29	13	57	.20-.29	2	95	.20-.29		
.10-.19	25	87	.10-.19	3	99	.10-.19	1	100
.05-.09	11	100	.05-.09	1	100	.05-.09		
n	84			84			84	
Means		.31			.77			.91
Medians		.25			.89			.99
Modes		.14			.99			.99

^a Frequencies above the dotted line achieved conventional power level of .80.

TABLE 2
Interdisciplinary Comparison of Statistical Power Analyses

Publications ^a	Sample Sizes		Means of Statistical Power for Effect Sizes		
	Number of Studies	Number of Tests	Small	Medium	Large
Journal of Abnormal and Social Psychology (1960)	70	2,088	.18	.48	.83
American Educational Research Journal (1969-1970)	47	373	.14	.58	.78
Nine communication publications (1974)	46	1,298	.18	.52	.79
Journal of Applied Psychology (1974)	121	3,373	.25	.67	.86
Journal of Marketing Research (1981)	23	—	.41	.89	.98
Three management publications (1984)	84	7,215	.31	.77	.91
Academy of Management Journal	54	5,916	.31	.76	.92
Journal of Management	9	314	.34	.88	.97
Proceedings of the Midwest Division of the Academy of Management	21	985	.29	.74	.87

^a Surveys analyzing the respective publications were: Cohen (1962), Brewer (1972), Chase and Tucker (1975), Chase and Chase (1976), and Sawyer and Ball (1981).

statistical power of research published in the three management publications is generally comparable.

Obviously, a judgment about the power of management research depends on the three determinants: α , effect size, and reliability of results. Since we fixed α at the conventional .05 level, the following section provides an estimation of the second two codeterminants and a discussion of their implications.

DISCUSSION AND IMPLICATIONS

A crucial issue regarding effect size is whether it is typically small, medium, or large in management research. Ideally, we would have estimated effect size for each of the various topics represented by the 84 studies. As a proxy, we used the means of association estimates (\bar{r} 's and \bar{d} 's, corrected for statistical artifacts) reported in 12 published meta-analyses, which represented hundreds of studies and a wide variety of management-related topics; the Appendix lists the meta-analyses. When we transformed absolute estimates of relationships to effect sizes using Cohen's (1977) formula, the overall mean was .39. However, values varied widely from .05 for such effects as the impact of realistic job previews on performance (Premack & Wanous)² to .65 for correlates of role ambiguity in work settings (Jackson & Schuler). Generally, smaller effect sizes were found for relationships moderated by other variables. For example, McEvoy and Cascio found that the average effect size representing reductions in turnover owing to realistic job previews was .18; but when studies considered task complexity, the means for complex and less complex jobs changed to .23 and .04.

The reliability of results as a codeterminant of power was itself determined in this and all previous surveys of statistical power as a function of sample size per test,³ which implies an assumption that all studies were otherwise well conceived. However, Mitchell (1985) reviewed correlational research in organizational settings and concluded that design problems plagued many of these investigations. Such problems were not uncommon in the studies we analyzed, 86 percent of which represented correlational research. For example, we would expect the reliability of measures used in published research to be relatively high, and indeed, the median reliability in the population was .76; however, the range of reliability in the studies was from .40 to .90. In fact, only 49 percent reported reliability estimates; many meta-analyses have reported similarly small proportions. Moreover, only one type of reliability—internal consistency measured by α —was consistently checked. Given a broader interpretation of the universe (Cronbach, Gleser, Nanda, & Rajanratnam, 1972), other facets such as time, setting, or raters may also be sources of instability in measurement. Thus any interpretation of a reliability coefficient must be based on a clear definition of the universe to

² Studies cited without years are the meta-analyses used; see the Appendix for publication information.

³ In our population, the median n per test was 96 ($\bar{x} = 135$) with a range from 9 to 1,515.

which generalizations may be made. It was difficult to determine the universe of interests in many of the studies analyzed and whether their samples were random. In Mitchell's (1985) survey, over 80 percent of the studies employed some form of convenience or cohort sampling. As Campbell (1976) pointed out, the potential impact of this common practice is to increase the amount of sampling error and the variability of the estimates.

The immediate implication of those characteristics, which were strikingly common across the three publications we surveyed, is that detected effect size in typical management research may be even smaller than .39. This judgment is consistent with Cohen's (1977) suggestion that small effect sizes are the norm, not the exception, in the social sciences. Consequently, the statistical power of the type of research examined here may be much lower than has often been assumed.

An important finding of this study was that explicit consideration of power issues was almost nonexistent. It seems that whenever restrictions on sample size were lacking, the rule of thumb was the larger the better. This was the case in several studies despite the efficiency statistical power planning could have afforded. Consider, for example, a study in which a large n (1,515) was used to detect the incremental impact of five variables on life satisfaction. With this large n the study achieved over 99 percent power for the three levels of effect size. Power planning could have shown that even if the estimated effect size was small, with each variable's unique contribution to variance explained as low as 2 percent, only 660 observations would have sufficed to achieve the conventional level of power (80%) with $\alpha = .05$. If the risk represented by α was four times more serious than that represented by β , as the above level for α and the 80 percent power imply, then the researchers could have used the resources gained by having 800 fewer participants to test additional hypotheses or to assess and improve the various psychometric aspects of their instruments; or the remaining individuals could have served as a hold-out sample for the purpose of cross validation. In fact, despite the importance of cross validation for assessing the stability of results and hence gauging the validity of statistical conclusions, only 10 percent of the studies explicitly addressed the issue. The utility of these alternative uses of additional resources should in the long run improve both theories and instruments, which may enlarge detected effect sizes and in turn improve power. It should be noted, however, that although power planning may require a specific n , researchers should also consider other research requirements like the stability of factor loadings. Our point is that decisions about n ought to be well conceived and thoroughly justified.

Explicit attention to power planning may also show that power codeterminants vary for different relationships within the same study; thus, one investigation may incorporate several power levels. A quasi-experimental study concerned with the effects of goal setting and feedback on role ambiguity and role conflict provides an interesting example. The study's sample ($n = 93$) was divided into three unequal experimental groups and one control group. The conclusion, based on a nonsignificant F , was that "anticipated

effects of goal setting and feedback on role characteristics and goal attributes were not supported" (Kim, 1984: 146; emphasis added). Implicit in this conclusion was the assumption that the effect size for feedback and role ambiguity was the same as that for feedback and role conflict. However, meta-analyses of these two relationships (Fisher & Gitleson; Jackson & Schuler) have documented that the former is typically large and the latter medium in size. With $\alpha = .05$, the given n 's, and our knowledge of effect size, it can be shown that statistical power for the conclusion regarding the hypothesis concerning feedback and role ambiguity was in the .90s, but for the hypothesis concerning feedback and role conflict it was only in the .40s. Thus, a null conclusion regarding the latter relationship carried a more than 50 percent risk of being erroneous.

When a small sample relative to the effect size in question is a realistic constraint on the power of research, sharpening insight and seeking other ways to improve power becomes a necessity. Fredrickson's (1984) study provides a case in point. Working with only 37 firms, he developed a model in which strategic comprehensiveness was a decision making process with four operationally defined steps. Since firms may employ any or all of the four steps, the model offered an opportunity to maximize detected variance. Additionally, he employed multiple scores to assess the study's constructs, included single- and multiple-item scales, assessed and partialled potential confounds, and checked the validity of the theoretical model and its constructs. Further, the use of a theoretical model offered the study the benefit of a directional α twice as large as a nondirectional α , which increased power. Because the study was well conceived, its large correlations ($r = .43-.49$) could be used to approximate effect size for the population (Cohen, 1977). With a directional $\alpha = .05$ and a large effect size, the power of the study would have exceeded the conventional .80 level using only the 37 firms. Thus, although Fredrickson found numerous significant relationships at the stated level of α , there was also a low level of risk (β) associated with the study's null conclusions. Unfortunately, even in this well-conceived study, there was no explicit consideration or calculation of power.

The implications of power planning or its a posteriori calculations are important for researchers and practitioners. Those who read and use research need to know the risk incurred in nonsignificant findings. In addition, statistical tests must be sensitive enough to detect small effects if they are theoretically or practically important. For example, Terborg, Lee, Smith, Davis, and Turbin (1982) estimated that an improvement as small as one-half standard deviation in satisfaction with work would translate to a 24 percent savings from avoided absenteeism. Studies not powerful enough to detect such small effects may indeed overlook significant savings. However, because various ways to improve power have unequal costs (Overall & Dalal, 1965), investigators should consider both the direct and indirect benefits and costs of every design. One of the by-products of power planning is that it may help researchers communicate potential savings and costs associated with different strategies or interventions to practitioners. For example,

McEvoy and Cascio found the average effect size of job enrichment on turnover to be twice as large as that of realistic job previews. Using certain parameters, they estimated that savings could reach \$79,900 if job enrichment were adopted and \$42,300 with job previews. In such a case, knowing the effect size would help practitioners become aware of potential savings from (1) competing strategies for reducing turnover, and (2) conducting research on job enrichment with relatively small samples.

CONCLUSIONS

If the effect size in this study is similar to that obtained from published meta-analyses ($\leq .39$), the studies we investigated may have been less than adequately powerful. This conclusion is important and surprising. It means that although many studies were designed to reject the null hypothesis, they were in fact conducted with at most a 50-50 chance of achieving that goal. Even when an effect size is medium or large, explicit planning of statistical power can prove useful. In addition to allowing assessment of the probability of rejecting the null hypothesis, formal power planning enhances efficiency, links new and previous research by requiring the assessment of effect size, sensitizes researchers to the impact of theoretical insight and reliability of results on research conclusions, and makes possible the detection of small effects of theoretical and practical importance. Every published work is the culmination of many hours of research. It is worth devoting what we estimate will be only one additional hour of planning to map a study's statistical power and thus maximize its chances to detect what it is designed to detect.

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APPENDIX

The following are the meta-analyses that we surveyed to estimate effect sizes.

- Cotton, J. L., & Tuttle, J. M. 1986. Employee turnover: A meta-analysis and review with implications for research. *Academy of Management Review*, 11: 55-70.
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© Academy of Management Journal
1987, Vol. 30, No. 2, 380-393.

DIVERSIFICATION AND PERFORMANCE: A REEXAMINATION USING A NEW TWO-DIMENSIONAL CONCEPTUALIZATION OF DIVERSITY IN FIRMS

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In his pioneering research, Rumelt (1974) developed an approach to categorizing the extent and type of diversification of firms that is based on relatedness of products, markets, and technologies, and he examined the levels of economic performance associated with nine different categories of diversification he identified. His approach to measuring diversity, which built on the work of Wrigley (1970), represented a significant conceptual leap over the traditional diversity measures based on product count that were, until then, widely used in industrial organization economics. Rumelt's approach has, however, the disadvantage of subjectivity. In addition, it is time-consuming and involves assembling data from numerous fragmentary

The authors acknowledge the assistance that John Fraedrich, a doctoral student in marketing at Texas A & M University, provided during data collection for this study.

sources like annual reports, 10-Ks, and other publications. Although Montgomery (1982) demonstrated that use of either Rumelt's approach or the traditional measures based on standard industrial classification (SIC) codes produces similar classifications, Nathanson (1985) challenged the adequacy and managerial usefulness of Rumelt's classification scheme. Thus, the measurement of diversification of firms remains a controversial and unsettled area. Pitts and Hopkins (1982) provided an excellent review of the conceptual and methodological issues involved in such measurements.

Some early extensions of Rumelt's work simply circumvented the measurement problem by using the same firms and classifications he did (Bettis, 1981; Bettis & Hall, 1982). Recently, researchers interested in examining the relationship between diversification and performance have attempted to develop measures of diversification that combine the conceptual attractiveness of Rumelt's scheme with the relative objectivity and accessibility of readily available data based on SIC codes (Palepu, 1985; Varadarajan, 1986). Palepu, for example, used Jacquemin and Berry's (1979) entropy measure of diversification to construct four diversification categories. Our study reexamined the linkage between diversity and performance using a new method of categorizing firms based on their degree and direction of diversification. This approach overcomes the problem of subjectivity inherent in Rumelt's classification scheme and makes no demands for the detailed business-level data that is a prerequisite of Palepu's approach. Yet the resulting classifications share close similarities with both Rumelt's and Palepu's categories.

A number of considerations highlight the need for further research on the linkage between diversity and performance. Since Rumelt's (1974) study is now more than a decade old, it is conceivable that managers' attitudes regarding diversification and their ability to manage diversity have undergone significant changes as a result of their firms' experiences with diversification over this period. Hence, a reevaluation of Rumelt's findings under a different set of circumstances is desirable. Toward this end, we used current data on diversification and performance of firms.

In addition to the criticisms surrounding Rumelt's approach to the measurement of firm diversify, challenges have emerged regarding the findings and strategic implications of his study. Rumelt found that the highest levels of financial performance were associated with his related diversification category and the lowest levels with his unrelated diversification category. Bettis and Hall (1981, 1982) noted that the overrepresentation of firms from one industry—pharmaceuticals—in his related-constrained group was partly responsible for the superior performance Rumelt attributed to related diversification. Christensen and Montgomery (1981) similarly suggested that systematic differences in market structure across the firms in the different diversification categories, rather than the diversification categories per se, may have been responsible for the performance differences Rumelt observed. Indeed, Montgomery (1985) reported that, after controlling for market share and industry profitability, she did not find diversification to have a significant effect on corporate performance as measured by return on invested

capital. Finally, Bettis and Mahajan (1985) introduced the notion of risk to the study of the relationship between diversity and performance, and found that, viewed in terms of risk and return, related diversification is not an unmixed blessing nor is unrelated diversification a sure prescription for disaster. Although Rumelt (1982) convincingly defended the basic robustness of his original findings, questions about his approach to the measurement of diversity and the influence of diversity on performance still warrant additional investigation.

A NEW TWO-DIMENSIONAL CONCEPTUALIZATION OF DIVERSITY IN FIRMS

This study employed a two-dimensional, categorical measure of firm diversity that builds on the work of Berry (1971) and Wood (1971). Wood distinguished between two distinct patterns of diversification—narrow spectrum diversification, abbreviated as NSD, and broad spectrum diversification, or BSD. She defined narrow spectrum diversification as expansion, other than vertical integration, outside a four-digit SIC industry but within a two-digit SIC industry; broad spectrum diversification refers to expansion, other than vertical integration, into a different two-digit SIC industry.¹

In this study, we adopted Wood's basic scheme but dropped her refinements concerning the engineering and nonengineering sectors. The present scheme treats BSD and NSD as the two dimensions of a four-cell matrix. Since for a given two-digit SIC code a firm may be active in many or few four-digit SIC code levels, we modified the NSD measure, designating instead the average number of four-digit SIC codes per two-digit SIC code in which a firm is active. We named this measure mean narrow spectrum diversity (MNSD). Figure 1 shows the resulting four-cell matrix, in which each cell represents the totality of a firm's past diversification activities in various two- and four-digit SIC industry categories.

A comparison of the BSD and MNSD values of two hypothetical firms, X and Y, operating concurrently in an equal number of nonidentical four-digit SIC categories illustrates the logic underlying this two-dimensional structure. We assume that the BSD and MNSD values of firms X and Y lead to respective assignments to cells B (low BSD—high MNSD) and C (high BSD—low MNSD). The literature generally views narrow spectrum diversification—within two-digit industries—as diversification into areas closely related to a firm's primary activities and areas of technical expertise; on the other hand, it views broad spectrum diversification—across two-digit industries—as diversification into areas either unrelated to or less closely related to a firm's primary activities and areas of technical expertise (Jacquemin & Berry, 1979;

¹These definitions differ slightly for firms in the engineering sector (SIC codes 35 through 39), for which BSD is defined as expansion into a different two-digit SIC industry outside of the engineering sector and NSD as expansion other than vertical integration outside a four-digit SIC industry, but within either a two-digit SIC industry or a different two-digit SIC industry within the engineering sector.

FIGURE 1
A Two-Dimensional Conceptualization of Diversity in Firms

Broad spectrum diversity ^a	High	Cell C: Unrelated- diversified firms	Cell D: Firms with very high diversity
	Low	Cell A: Firms with very low diversity	Cell B: Related- diversified firms
		Low	High
		Mean narrow spectrum diversity ^b	

^a Broad spectrum diversity (BSD) is the number of two-digit SIC categories in which a firm concurrently operates.

^b Mean narrow spectrum diversity (MNSD) is the number of four-digit SIC categories in which a firm operates divided by the number of two-digit SIC categories in which it operates.

Palepu, 1985; Wood, 1971). Despite certain shortcomings, this conceptualization also provides the inner logic of the SIC coding scheme itself. Against this backdrop, although both firms concurrently operate in an equal number of four-digit SIC categories, firm X can be viewed as being diversified into closely related areas, and firm Y as diversified into unrelated or less related areas.

A desirable feature of our proposed conceptualization is that it does not require data on revenues of business segments, but still provides insights into both (1) the degree of diversification, high versus low, and (2) its direction, predominantly related or predominantly unrelated.

The proposed categorization scheme has similarities to other extant conceptualizations of diversity. Firms in cell A have their counterparts in Rumelt's (1974) scheme as either single or dominant business firms. Cell B firms, which display a high degree of mean narrow spectrum diversity but a low level of broad spectrum diversity, are most apt to correspond to Rumelt's related-diversified firms. Cell C firms, which are broadly diversified at the two-digit level but reveal a low degree of diversification in any particular two-digit industry, have their counterparts in Rumelt's unrelated diversification category. Cell D firms lack a strict correspondence in Rumelt's typology and are best viewed as highly diversified firms that are neither predominantly related-diversified nor predominantly unrelated-diversified.

The four categories represented by the four cells in Figure 1 also correspond closely to Palepu's (1985) classification, which also employed a four-cell categorization using the related and unrelated entropy measures of Jacquemin and Berry (1979). Computing entropy measures of diversification requires detailed business-level information, such as breakdown of sales by SIC codes at both two- and four-digit levels; such information is generally

not available and when available is likely to be of untested reliability. Furthermore, if the ultimate aim is to develop categories through transformation of continuous variables into categorical variables, then it is probably not critical to measure the axis variables precisely, since the process of developing categories obscures much of this information anyway.

DATA BASE AND POPULATION

The ten largest firms in each of the 25 largest industries in the United States constituted the original population for this study (Perry, 1984). We obtained information on the numbers of two-digit and four-digit SIC categories in which firms and their subsidiaries operated from the 1984 edition of the *Directory of Corporate Affiliations* (National Register Publishing Company).

Four measures of financial performance were used in this study: return on equity (ROE), return on total capital (ROC), sales growth rate (SGR), and earnings-per-share growth rate (EPSGR). Most of the previous studies on the relationship between diversity and performance have used these measures, thus facilitating comparisons of our results with previous work. Two of the measures, SGR and EPSGR, tap firms' rates of growth, and the other two, ROE and ROC, reflect the productivity of capital employed.

Data on the performance indicators were assembled from the *Forbes 36th Annual Report on American Industry* (1984). To reflect a long-term perspective and to eliminate any possible noise that year-to-year fluctuations might introduce, we used five-year averages for each of the performance indicators.

Data on diversity were available for only 223 of the 250 firms in the original population. We classified these firms into the four cells of Figure 1 using the mean values of BSD (10.74, s.d. = 6.51) and MNSD (1.99, s.d. = 0.53) as cut-off points to establish low-high splits along each dimension. The Appendix presents industrial and diversification categories for these 223 firms. Unavailability of performance data reduced the number of firms studied to 216. We used two-way analysis of variance to analyze the relationship between diversity and performance.

RESULTS

Table 1 contains means, standard deviations, and intercorrelations for the performance variables employed in the study for the total population.

Table 2 summarizes results of the ANOVA, which indicate that both BSD and MNSD are significantly associated with performance. Differences across the BSD groupings are significant for all four measures of performance, and differences across the MNSD groupings are significant for return on total capital and marginally significant for return on equity. The growth measures do not show significant differences across the MNSD categories. Similarly, the interaction term is uniformly nonsignificant for all four performance measures. However, since diversification at the four-digit level follows from

TABLE 1
Means, Standard Deviations, and Bivariate Correlations
Among Performance Measures

Variables	Means	Standard Deviations	1	2	3	4
1. Return on equity	15.4	6.56				
2. Return on total capital	11.9	5.46	0.90***			
3. Sales growth rate	13.3	7.40	0.50***	0.42***		
4. Earnings-per-share growth rate	7.9	11.34	0.79***	0.72***	0.56***	

*** $p < .001$

diversification at the two-digit level, the two dimensions of the matrix in Figure 1 are not strictly independent concepts, so the interaction term's informational content is limited.

Of more interest than the overall differences in performance are the differences between cell B and cell C firms, whose counterparts are Rumelt's (1974) related and unrelated diversification categories and Palepu's (1985) predominantly related-diversified and predominantly unrelated-diversified categories. Pairwise comparison of group means across the cells shows that cell B and cell C firms differ significantly with respect to both measures of profitability and to one of the two measures of growth, findings generally in line with Rumelt's conclusions.

Table 2 focuses on group means and gives only a partial picture. In an effort to understand better the relationship between diversity and firm performance, we also compared the distribution of diversification categories across performance quartiles, with primary focus on the incidence of cell B and cell C firms in the highest and lowest performance quartiles. For the most part, cell A firms, those with very low diversity, and cell D firms, with their very high diversity, were more or less equally distributed across the extreme performance quartiles.

The percentages of cell B and cell C firms falling into the lowest performance quartile with respect to the four performance measures were as follows: (1) ROE, 14 and 45 percent; (2) ROC, 16 and 37 percent; (3) SGR, 26 and 28 percent; and (4) EPSGR, 16 and 38 percent. In contrast, the percentages of cell B and cell C firms in the highest performance quartile with respect to the same performance measures revealed the reverse pattern: (1) ROE, 29 and 24 percent; (2) ROC, 35 and 17 percent; (3) SGR, 32 and 16 percent; and (4) EPSGR, 31 and 11 percent. Furthermore, in respect to three of the four performance measures (ROC, SGR, and EPSGR), the largest number of cell B firms were in the highest performance quartile. Cell C firms, on the other hand, displayed the opposite tendency, with the largest number falling in the lowest performance quartile for three of the four measures—ROE, SGR, and EPSGR.

TABLE 2
Results of Two-Way Analysis of Variance of Performance
by Diversification Category

Performance Measures	Diversification Categories ^a						F - Ratios			
	Cell A: Low MNSD- Low BSD	Cell B: High MNSD- Low BSD	Cell C: Low MNSD- High BSD	Cell D: High MNSD- High BSD	MNSD	BSD				Interactions
Profitability measures										
Return on equity	15.5	17.2 ^b	13.5 ^b	14.8	2.87*	5.85**	0.06			
Return on total capital	11.6	13.7 ^b	9.8 ^b	11.9	8.09***	5.54**	0.001			
Growth measures										
Sales growth rate	14.9 ^b	13.9	11.1 ^b	12.2	0.03	7.08***	1.11			
Earnings-per-share growth rate	9.8 ^b	10.2 ^c	3.5 ^{b,c}	6.4	0.85	9.69***	0.65			

^a For total population, N = 216; for cells, A = 67, B = 58, C = 43, and D = 48.
^{b,c} Denote significantly different pairs of group means ($p < 0.05$), based on Duncan's multiple range test.
* $p < .10$
** $p < .05$
*** $p < .01$

For a more stringent comparison of the distribution of diversification categories across the performance groups, we placed firms that consistently performed below the median levels with respect to all four measures in a group labeled consistently poor performers and compared them with firms that consistently performed above those levels, labeled consistently superior performers. Table 3 shows the results of the imposition of this compound criterion. The associated chi-square statistic was significant.

DISCUSSION

The results summarized in Tables 2 and 3 are revealing. Table 2 basically confirms Rumelt's (1974) pattern of findings, in that related diversifiers, or firms in cell B, on average tend to outperform unrelated diversifiers (cell C firms). Note, however, that the extreme diversity found in cell D firms, which do not have a counterpart within Rumelt's categorization scheme, is not associated with low performance. The performance differential between extremely low levels and extremely high levels of diversity—cell A versus cell D firms—is generally nonsignificant.

Despite the general support for Rumelt's findings, the distribution of cell B and cell C firms across performance quartiles as well as the results reported in Table 3 highlight the dangers of generalizations regarding the nature of diversification and performance. As an illustration, with ROC as the performance criterion, there were nine very low-performing related diversifiers, or 16 percent, and seven very high-performing unrelated diversifiers, or 17 percent—neither a small proportion. Similarly, the observed

TABLE 3
Distribution Across Diversification Categories
for Two Performance Groups^a

Performance Groups ^b	Diversification Categories			
	Cell A: Low MNSD— Low BSD	Cell B: High MNSD— Low BSD	Cell C: Low MNSD— High BSD	Cell D: High MNSD— High BSD
Consistently poor performers				
Number	13	11	17	15
Percentage	43	32	62	55
Consistently superior performers				
Number	17	23	8	12
Percentage	57	68	38	45

^a Chi-square = 8.17, 3 df, $p < .05$.

^b Firms that performed below median levels with respect to all four performance measures used in this study constituted the consistently poor performers, and firms that performed above median levels with respect to all four performance measures were the consistently superior performers.

proportions of very high-performing related diversifiers, which included 19 firms or 35 percent, and of very low-performing unrelated diversifiers, 15 firms or 37 percent, are not so overwhelming as to cast related diversification in a very favorable light or unrelated diversification in a very unfavorable light.

In addition, Bettis and Mahajan's (1985) analysis of a sample of U.S. firms revealed systematic differences in risk across the diversification categories, reinforcing the need for caution against blanket generalizations linking relatedness in diversification and corporate performance. Owing to lack of availability of data on risk, we could not examine whether the observed differences in performance across our categories also reflected corresponding levels of risk. Nevertheless, our results nicely complement those of Bettis and Mahajan, suggesting that (1) related diversification may be a necessary, but not sufficient, condition for superior performance, and (2) that although the odds are generally stacked against unrelated diversification, a number of firms can apparently manage the demands of an unrelated diversification strategy well. Interestingly, Dundas and Richardson (1982) identified the strategic and administrative characteristics of firms that are able to successfully implement strategies of unrelated diversification. Leontiades (1986) provided a detailed exposition of the rationale for unrelated diversification by invoking the theory of contestable markets.

In summary, the results of this study support several conclusions. First, this paper provides additional evidence for the general robustness of Rumelt's original findings regarding the relationship between diversity and performance. Second, the results nevertheless temper the claims of the absolute performance advantages attributed to related diversification and the performance penalty often ascribed to unrelated diversification in the literature. Finally, the study presents a new two-dimensional approach to the measurement of firm diversity for future researchers interested in further pursuing this central topic in strategy research.

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APPENDIX

Composition of Population

Industrial Categories ^b	Diversification Categories ^a			
	Cell A: Low MNSD– Low BSD	Cell B: High MNSD– Low BSD	Cell C: Low MNSD– High BSD	Cell D: High MNSD– High BSD
Aerospace	McDonnell Douglas	Boeing Lockheed Rockwell International	Grumman Northrop	General Dynamics Martin Marietta Signal Companies United Technologies

APPENDIX (continued)

Industrial Categories ^b	Diversification Categories ^a			
	Cell A: Low MNSD– Low BSD	Cell B: High MNSD– Low BSD	Cell C: Low MNSD– High BSD	Cell D: High MNSD– High BSD
Apparel		Blue Bell Cluett, Peabody Hartmarx Kellwood Palm Beach VF Warnaco		Gulf & Western Industries Interco
Beverages	Brown-Forman General Cinema Heublein Pepsico	Coca-Cola G. Heileman Brewing	Anheuser- Busch	
Chemicals	Hercules	American Cyanamid Celanese	Dow Chemical Monsanto	Allied DuPont FMC Union Carbide W. R. Grace
Commercial banking	Bank America Bankers Trust of N. Y. Chase Manhattan First Interstate Bancorp Manufacturers Hanover Security Pacific	Chemical New York Citicorp Continental Illinois J. P. Morgan		
Diversified financial	First Boston	American General Cigna Great Western Financial Merrill Lynch Travelers Corporation		Aetna Life & Casualty American Express
Diversified services	McKesson Super Valu Stores	Fleming Companies Philbro-Salomon	Farmland Industries	City Investing Fluor Halliburton RCA
Electronics, appliances		Motorola Western Electric	Litton Industries Warner Com- munications	Emerson Electric General Electric ITT Raytheon Westinghouse Electric

APPENDIX (continued)

Industrial Categories ^b	Diversification Categories ^a			
	Cell A: Low MNSD— Low BSD	Cell B: High MNSD— Low BSD	Cell C: Low MNSD— High BSD	Cell D: High MNSD— High BSD
Food		Borden CPC Inter- national Dart & Kraft General Foods Ralston Purina		Beatrice Foods Consolidated Foods Nabisco Brands
Forest products	Champion International Kimberly-Clark St. Regis	Boise Cascade	International Paper Mead Scott Paper Weyerhaeuser	Crown Zellerbach Georgia-Pacific
Glass, concrete, abrasives, gypsum	Anchor Hocking Corning Glass Works Libbey-Owens- Ford	National Gypsum PPG Industries	Manville Norton Owens-Corn- ing Fiber- glass U.S. Gypsum	Owens-Illinois
Industrial, farm equipment	Caterpillar Tractor Deere	Ingersoll-Rand	Baker Inter- national Dresser Industries Textron	Borg-Warner Combustion- Engineering Kidde Teledyne
Metal manu- facturing		Republic Steel	Alcoa Armco Inland Steel Kaiser Aluminum & Chemical LTV National Steel Reynolds Metals	Northwest Industries
Metal products	CBI Industries Crown Cork & Seal Gillette National Can	Harsco	American Can Chromalloy American Foster Wheeler	Continental Group
Mining, crude oil, coal	Freeport- McMoran Louisiana Land & Exploration Mitchell Energy & Development Moore McCor- mack Resource		Occidental Petroleum	Amax

APPENDIX (continued)

Industrial Categories ^b	Diversification Categories ^a			
	Cell A: Low MNSD— Low BSD	Cell B: High MNSD— Low BSD	Cell C: Low MNSD— High BSD	Cell D: High MNSD— High BSD
Mining, crude oil, coal (cont.)	Natomas Superior Oil Vulcan Materials Westmoreland Coal			
Motor vehicles and parts	Paccar	International Harvester TRW	American Motors Chrysler Dana Ford Motor	General Motors Fruehauf Eaton
Office equipment & computers	Burroughs Digital Equip- ment Honeywell IBM NCR Sperry Wang Labora- tories	Hewlett- Packard Pitney Bowes		Control Data
Petroleum refining	Mobil		Gulf Oil Phillips Petroleum Shell Oil Standard Oil of Indiana Texaco	Exxon Standard Oil of California U.S. Steel
Pharmaceuticals	Upjohn	Abbot Labora- tories Bristol-Myers Smith Kline Beckman Warner-Lambert	Johnson & Johnson Merck	American Home Products Pfizer
Precision instruments	Eastman Kodak Polaroid Tektronix Xerox	Beckton Dickinson EG&G Perkin-Elmer	3M	General Signal Lear Siegler
Publishing, printing	Dow Jones Knight-Ridder Newspapers McGraw-Hill Tribune	Gannett New York Times R. R. Donnelley & Sons Times Mirror Washington Post	Time Inc.	

APPENDIX (continued)

Industrial Categories ^b	Diversification Categories ^a			
	Cell A: Low MNSD– Low BSD	Cell B: High MNSD– Low BSD	Cell C: Low MNSD– High BSD	Cell D: High MNSD– High BSD
Retailing	American Stores Federated Department Stores K-Mart Kroger J. C. Penney	Safeway Stores Winn-Dixie	Sears Roebuck	Household International Lucky Stores
Transportation	AMR (American Airlines) Burlington Northern Norfolk Southern Pan American World Airways UAL	United Parcel Service	CSX Trans World	
Utilities	American Electric Power Commonwealth Edison Middle South Utilities Public Service Electric and Gas Southern Com- pany Texas Utilities	AT&T GTE Pacific Gas & Electric		

^a Figure 1 describes the diversification categories.

^b The source of the list of companies and industrial categories was Perry (1984).

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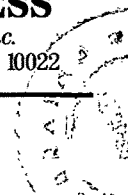
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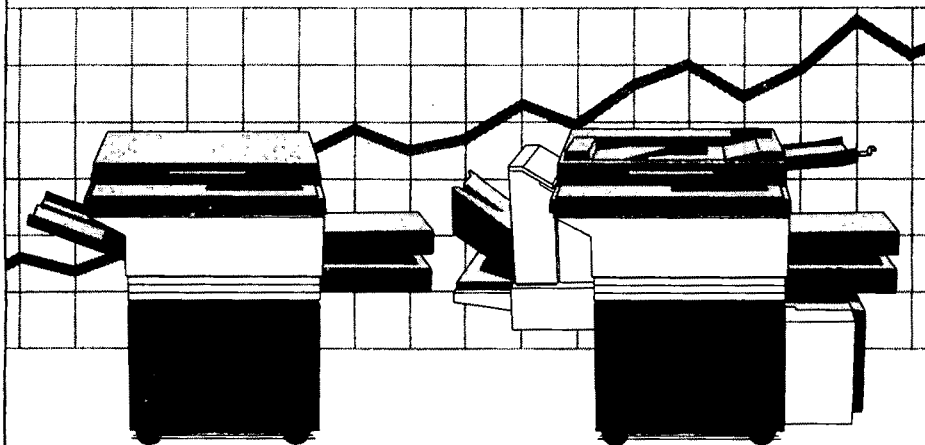
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